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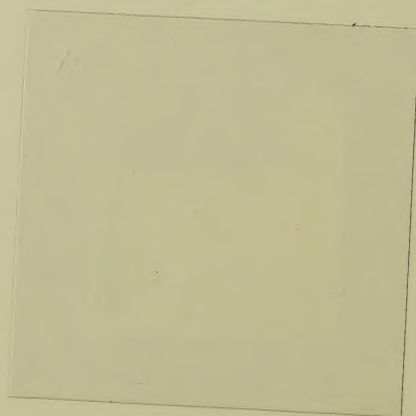
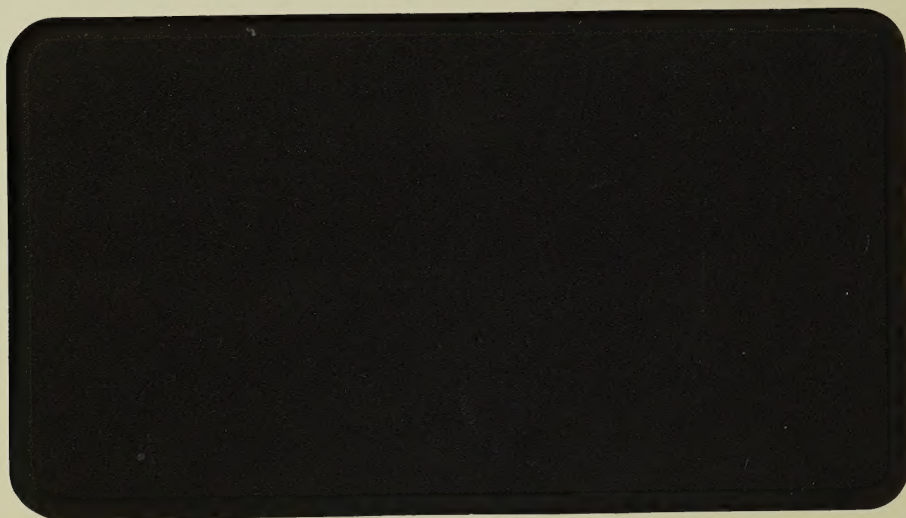
URBAN MUNICIPAL  
APR 3 1989  
GOVERNMENT DOCUMENTS

REMEDIATION PLAN  
FOR THE FORMER LAX PROPERTY



CANVIRO  
CONSULTANTS

A Division of  
CH2M HILL  
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CANVIRO  
CONSULTANTS

Project: KI23733.B0

URBAN MUNICIPAL  
APR 3 1989  
GOVERNMENT DOCUMENTS

REMEDIATION PLAN  
FOR THE FORMER LAX PROPERTY

Prepared for:  
THE CITY OF HAMILTON

By:  
CANVIRO CONSULTANTS

Under Subcontract to:  
BAR ENVIRONMENTAL

March 17, 1989







## EXECUTIVE SUMMARY

### I. BACKGROUND

The Former Lax Property site is located along the southwest shore of Hamilton Harbour, in the City of Hamilton, Ontario. The City of Hamilton ("the City") expropriated the property from the former owners, and plans to develop the site into a major waterfront park.

The property was previously a waterlot which was filled with a variety of fill materials including some wastes generated by the steel industry. Because the site was formerly used for waste disposal, the Ontario Ministry of the Environment requires the City to develop and implement a Remediation Plan to deal with the wastes present on the site. This remediation will be required whether or not the property is developed into a park.

After several months of negotiating the terms of reference for "Development of a Remediation Plan for the Former Lax Property", the City engaged BAR Environmental Inc. and CANVIRO Consultants in October 1988 to develop the Remediation Plan.

The main elements of this Remediation Plan are summarized in Sections II - IX.

### II. SUMMARY OF PREVIOUS INVESTIGATIONS INCLUDING ONGOING CANVIRO HYDROGEOLOGICAL ASSESSMENT

A summary of previous investigations indicated the presence of waste material exceeding MOE guidelines for de-commissioning sites. As well, lead and cadmium were found in groundwater at concentrations exceeding drinking water criteria. However, the available information was not sufficient to allow for any quantification of material requiring removal.

Some further preliminary conclusions and recommendations related to the site soils and groundwater have been presented in the CANVIRO hydrogeological study draft report, which is being finalized in parallel with the Remediation Plan. These include:

- o Evidence of industrial waste, randomly mixed with clean fill was found throughout the entire 14.4 metres (47 feet) of fill material. However, the wastes which are of concern and require removal by the MOE are the bulk surface waste deposits which exceed MOE Regulation 309 criteria.





- o A number of inorganic and organic chemicals were detected in the groundwater in monitoring wells on the property, but only 5 chemicals exceeded recommended water quality criteria. Confirmation of the concentrations and significance of the analytical results is still being evaluated in conjunction with the MOE before finalizing the report.
- o The hydrogeological data indicate a requirement for a low permeability soil cover to reduce surface water infiltration into the site and to prevent the public from having direct contact with any residual waste material.
- o Further monitoring and interpretation of the groundwater quality data is necessary to fully assess the impact of the site on the Hamilton Harbour water quality.

### III. WASTE IDENTIFICATION

During preparation of the Remediation Plan proposal, the MOE insisted that known surface deposits of waste material exceeding criteria for leachate toxic or hazardous waste as specified by MOE Regulation 309 would have to be removed from the site. Therefore, in order to identify wastes requiring removal, the initial task in the site investigation involved collecting 29 samples of surface waste deposits, from which 6 major waste "types" were identified.

The results of the sampling and leachate testing indicated that two waste types (called Waste Type 1 and Waste Type 2 in the report) exceeded the MOE Regulation 309 criteria for lead and cadmium in leachate and therefore this material would require removal from the site. Waste Type 1 and Waste Type 2 are described below.

#### Waste Type 1

When dry the material varied from royal blue to dark brown and black in colour exhibiting a hard crumbly texture. When moist the material varied from dark brown to black in colour and was fine grained and cohesive. When pinched between the thumb and forefinger it left a thin, dark brown film that was difficult to remove. This material has been called "iron oxide" or "flue dust" by other previous investigators.





## Waste Type 2

This is a coarse, granular material with various concentrations of brown, rust and gray particles. One common characteristic among all samples was the presence of bluish-gray particles. This material has been referred to as "copper sulphate" material by other previous investigators.

### IV. WASTE QUANTIFICATION

After identifying the visual characteristics of the waste types requiring removal, a subcontractor with hydraulic backhoes was engaged to excavate test trenches and test pits so that the total in situ volume of waste material designated for removal could be identified. Calculations based on the results of these excavations provided an estimated in situ volume of 9030 cubic metres requiring removal. This converts to 19,140 tons when a bulking factor (20%) and conversion factors are applied. Imperial units were used for costing purposes as this is what most contractors used when asked to provide cost estimates.

### V. RECOMMENDED REMEDIATION PLAN

The recommended remediation plan includes specifications for both the designated waste removal and a low permeability soil cover. It also includes a section on short term groundwater monitoring and a section on contingency measures for groundwater containment, collection, and treatment (which would become necessary if (based on future monitoring) the site groundwater is deemed by MOE to have a serious impact on the Hamilton Harbour water quality).

The designated waste removal is to be conducted in accordance with one of the following:

- o Excavating, loading and hauling the designated waste material, as is, to a solid waste disposal site which is licenced for hazardous wastes.
- o Excavating, loading and hauling the designated waste material, as is, to a facility to stabilize the material, then subsequently loading and hauling the stabilized material to a solid industrial waste disposal site.

The groundwater monitoring program is short-term (ie. two years). It is composed of taking samples from four monitoring wells located near the perimeter of the site. This sampling is to be conducted 4 times per year for 2 years. The groundwater is to be analyzed for cadmium, lead, chromium, zinc, nickel, pH, temperature, conductivity and PCBs.





The contingency measures for groundwater would involve installing a hydraulic barrier (ie. a subsurface slurry wall or equivalent) around the perimeter of the site. Inside the barrier, a drainage system complete with piping, sumps and pumping would be placed to allow removal of the contaminated groundwater for subsequent treatment and disposal.

The estimated costs for these measures would range between \$1,890,000 to \$2,550,000 (spring 1989 dollars).

#### VIII. CONSIDERATIONS DURING SITE DEVELOPMENT

The major consideration during site development is the avoidance of future excavation whenever possible. Attempts should be made to place water, sanitary, electrical and other services in excavations created during the surface waste removals. Alternatively, such services could be run on the existing surface by deepening the low permeability soil cover, where necessary.

It is understood that proposed structures and buildings which require foundations below existing grade will have pile foundations which do not require excavation.

Any future site plans which require excavation should be discussed with the City of Hamilton's representative (tentatively slated to be CANVIRO).

#### IX. REMEDIATION SCHEDULE

The designated waste removal is scheduled for the spring and summer of 1989. The groundwater monitoring program is scheduled to begin in the spring of 1989 and continue until the spring of 1991. The low permeability soil cover is scheduled to be placed as part of the construction activities for the site development.





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## 1.0 INTRODUCTION

### 1.1 Background

The history of the Former Lax Property is documented in various reports prepared by the Ministry of the Environment, the City of Hamilton and their previous consultants. The location of the site is shown on the Location Plan, Figure 1.1. A few aspects of this history, which are relevant to the remediation plan include the following:

#### Prior to 1984

- Site owned and operated as a fill site by Lax brothers. Random deposition of baghouse dust, foundry sands, mill scale, slag and other industrial wastes occurred. (Wastes were deposited at various locations and depths on the site.)

#### 1984 to June 1986

- Subsequent to Trow Ltd. drilling 9 boreholes to determine the structural stability of the soil, the property was expropriated in 1984 by the City of Hamilton, which plans to develop the property into a major waterfront park.
- Various preliminary investigations were carried out during this period to locate, analyze and attempt to categorize industrial wastes deposited on the property. These included:
  1. MOE Phytotoxicology Study, Nov. 1984.
    - 13 surface soil/waste samples were collected, analyzed and compared to MOE Proposed Clean-up Criteria.
    - Report by Palmer, 1985.
  2. Kehoe (MOE) Site Mapping, March 1985.
    - Reviewed available data and developed rough maps of the site to locate and categorize waste types.
  3. McGlone, Preliminary Hydrogeological Investigation, August 1985.
    - 16 boreholes drilled and soils analyzed.
    - 4 piezometers installed.
    - Analyses by Hamilton-Wentworth Regional Lab and Report by Forde, 1985.









**FIGURE 1.1**

**LOCATION OF THE FORMER LAX PROPERTY  
HAMILTON, ONTARIO**





4. BAR Report, June 1986.
- BAR prepared report for City providing estimated removal costs and criteria.
  - Philip or Tricil recommended to conduct the work.

June 1986 to December 1986

- Philip Enterprises contracted to remove industrial waste. However, this was stopped by the City after it became apparent that better criteria were required for removal.
- BAR/Zenon Leachate Analysis (Nov. 1986).
  - Surface soil/waste samples were collected from 8 sites and forwarded to Zenon Laboratories for leachate analysis.

1987 to 1988

- CANVIRO and BAR submitted a proposal to the City of Hamilton to conduct a hydrogeological investigation at the former Lax property. This project is currently underway.
- CANVIRO and BAR prepared the initial proposal for development of a Remediation Plan for the former Lax property in July 1987.

May 24, 1988

- City of Hamilton, MOE, BAR, CANVIRO meeting to review the status of the Remediation Plan development. CANVIRO was instructed to organize available soil/waste characterization data and to prepare a brief report for May 31, 1988 summarizing surface and subsurface contamination, rough quantity and cost estimates and recommendations.

June 1, 1988

- City of Hamilton, MOE, BAR, CANVIRO met to discuss CANVIRO report which recommended placement of an impermeable soil cover, coupled with a groundwater monitoring and containment/treatment system as a contingency plan (ie. CANVIRO recommended that no further removal of industrial waste be seriously considered).





June 6, 1988

- City of Hamilton, MOE, BAR, CANVIRO met to discuss CANVIRO's report. A decision was made at the insistence of the MOE that known surface deposits of certain wastes must be removed from site.
- City of Hamilton sent letter to MOE summarizing the general concept of the remediation plan that was agreed to at the meeting.

June 7, 1988

- MOE replied to City of Hamilton letter of June 6, indicating acceptance of the general concept. However, there were some reservations and they included a request that major seams of hazardous waste must be removed.

June 14, 1988

- CANVIRO submitted a proposal for Development of a Remediation Plan for the Former Lax Property, which was based on the conceptual approach agreed upon on June 6 and 7.

June to September 1988

- City of Hamilton considered proposal and had further discussions with MOE.

September 28, 1988

- MOE, BAR, CANVIRO met to discuss the Ministry's current position on this matter and verify the conceptual plan for removal of hazardous wastes from the site.

October 3, 1988

- City of Hamilton, MOE, BAR and CANVIRO met and BAR/CANVIRO were directed to prepare a revised proposal for Development of a Remediation Plan for the Former Lax Property by October 7.

October 7, 1988

- The revised proposal was submitted and BAR/CANVIRO were then directed to proceed.





The overall objective of this project was to develop a comprehensive Site Remediation Plan for the Former Lax Property based on the conceptual approach agreed to in principle by the City and MOE (September 28 and October 3, 1988 meetings). This included the following:

- a) Industrial waste requiring removal was to be defined using visual criteria which was to be developed based on the results of the Ministry of the Environment's Regulation 309 leaching test.
- b) The emphasis of the removal program would be on the major known "bulk surface deposits" of industrial waste shown as Areas 1, 2 and 3 on Figure 1.2. Thus, the majority of site investigation work to characterize and develop removal quantity was to be undertaken in these areas.

It was understood from previous meetings cited, that in Areas 1 and 2, subsurface seams of waste would not be followed and it would not be necessary to investigate under a "hill" between Area 1 and Area 2. This is based on the rationale that the leaching test data existing at that time indicated that the waste in those locations was only marginally hazardous and would pass the Reg. 309 leaching test after excavation because mixing with adjacent clean soil would unavoidably occur when using large excavation equipment and would result in nonhazardous material in the disposal trucks. In Area 3, however, the existing leaching test data was such that the MOE requested removal of the bulk deposit of hazardous waste and any major seams of waste where the removed material (and adjacent soil) would exceed this criteria. It was recognized that this would require careful delineation at the time of the field investigation and to support this the MOE specifically requested one long circular trench around the perimeter of this area to be sure that any major seams were identified at this stage of the project (see Figure 1.2).

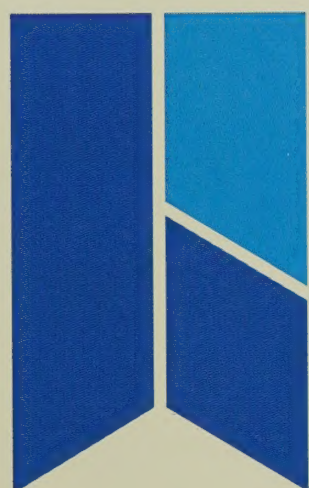
- c) Other smaller areas of visual industrial waste were identified during a site inspection by MOE, BAR and CANVIRO on June 7, 1988. Further site investigations were to be conducted in Areas 4, 5, 6 and 7 (see Figure 1.2). The waste in these areas was to be tested using the Regulation 309 leaching test and quantities requiring removal were to be determined.





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- d) Two major magnetic anomalies which were identified by Ministry staff at a meeting on June 1, 1988 as being of particular concern, were to be investigated and, if necessary, any removal requirements were to be included. The two anomalies referred to are shown on Figure 1.2.
- e) Other components of the Remediation Plan were to include:
  - i) Plans for regrading/contouring excavated areas around the site.
  - ii) Plans for site capping with clean material as deemed appropriate for the selected Waterfront Park Development Plan.
  - iii) A groundwater monitoring and contingency plan for containing and/or treating groundwater. This contingency plan would only be implemented if based on further monitoring, the groundwater was determined by the MOE to be seriously impacting the harbour.

Specific objectives of this study, aimed at providing technical data to support the development of the Remediation Plan, were:

- 1) To accurately measure locations and size of existing trenches, and visible surface deposits of industrial wastes.
- 2) To visually classify the various types of wastes, and confirm by sample collection, leachate testing, and comparison to MOE Reg. 309 criteria to identify types of wastes requiring removal.
- 3) To perform test pit trenching, sample collection, and analysis in areas of visible surface industrial waste where contamination is identified (Areas 1 to 7 on Figure 1.2); to determine size and volume limits of these surface pockets.
- 4) To carefully excavate soil in magnetic anomalies 1 and 2 (Figure 1.2) over which the MOE has expressed concern; to determine if any drums are present.
- 5) To dig two or three test pits in each of the north and south peninsulas of land; to confirm that these areas are clean.





- 6) To provide budget costs for the surface wastes requiring removal; for a soil cover; for groundwater monitoring; and for groundwater containment and treatment.
- 7) To obtain MOE approval of the recommended Remediation Plan.
- 8) To prepare and submit an engineering report that presents the recommended Remediation Plan to the City of Hamilton for approval.

After approval by City Council, Tender Documents for removal of the designated industrial wastes will be prepared by CANVIRO. This will include well defined procedures and criteria for managing the excavation operations to ensure that only wastes specified as requiring removal are in fact removed.

This report fulfills the 8 specific objectives listed above and provides the Remediation Plan for the site.

Chapter 2 summarizes the review of existing information that has been conducted. Chapter 3 describes the surface investigation program undertaken by CANVIRO during the winter of 1988-89; Chapter 4 discusses the Development of the Remediation Plan including cost estimates; Chapter 5 presents the Conclusions and Recommendations.





## 2.0 REVIEW AND SUMMARY OF EXISTING SITE INVESTIGATION DATA

### 2.1 General

A review and summary of the existing site investigation data was conducted prior to preparation of this plan and a report (CANVIRO, 1988a) was issued.

The major data and findings of that report are reviewed below.

### 2.2 Review of MOE Phytotoxicology Study (MOE, 1985) and 1985 Site Sketches

- o 13 surface soil/waste samples collected.
- o Analytical results were compared to MOE proposed clean-up criteria.
- o 9 of the 13 samples had one or more metals exceeding the proposed MOE clean-up criteria (7 for lead, cadmium and zinc; 2 others for molybdenum).
- o Site plans drawn in 1985 were not to scale but provided some indication of waste locations and types.

### 2.3 Review of McGlone, 1985 Preliminary Hydrogeological Investigation

- o 16 boreholes drilled
- o 4 piezometers installed (3 in the "centre" of the site).
- o 39 core samples analyzed for metals and compared to MOE proposed clean-up criteria.
- o Only one sample was apparently collected right at the surface (BH1). This sample had very high concentrations of some metals (cadmium, lead and zinc), indicating that surface materials may be more contaminated than subsurface materials. When compared with the phytotoxicology results, it was noted that there were 7 surface samples that also had very high metals concentrations. It was unknown based on the limited data and the different samplers, laboratories and times sampled whether this was a coincidence or not. However, many of





the 6 to 20 foot deep cores also had soil/waste exceeding the clean-up criteria indicating that surface clean-up alone (ie. to 3 foot depth) would not remove all of the industrial waste that exceeds MOE clean-up guidelines.

2.4      Review of BAR/Zenon (Zenon, 1986) Surface Sampling and Leachate Analyses, 1986

- o      A sketch of the waste/soil locations and classifications was provided along with visual descriptions of the sample sites.
- o      17 sites visually characterized by BAR to aid in removal of wastes (June 1986).
- o      Leaching tests were later (November 1986) conducted on 8 samples from the property including 6 of the 17 sites visually described by BAR and two soil/waste stockpiles (apparently left by Philip).

2.5      Review of Trow (1984) and CANVIRO (1988c) Borehole Log Observations

- o      Trow drilled 9 boreholes in 1984 for structural stability purposes.
- o      CANVIRO supervised drilling of boreholes at 7 locations in 1988.
- o      The locations of the Trow boreholes are presently unknown since the Trow site plan cannot be found by the City.
- o      CANVIRO borehole locations were placed on a site plan, along with other sampling locations.
- o      No soil core chemical analyses were conducted on either the Trow or CANVIRO boreholes.
- o      The comments on the borehole logs were interpreted (ie. samples were classified as either visually contaminated with industrial waste, or visually uncontaminated).
- o      It is noteworthy that industrial waste was identified at the 41 foot depth in borehole 4 by Trow, and several other deep locations of industrial waste were identified by both Trow and CANVIRO.





## 2.6 Summary of Existing Site Investigation Data

- o The site plan presented a summary of all borehole and sampling locations, as well as the locations of stockpiled material, visible industrial waste and excavated areas.
- o There was virtually no borehole data available which described the waste/soil from surface, on down to depth at various locations (ie. there was either only surface data or deeper core data but not both at the same location).
- o There was only the phytotoxicology data from 13 locations, the Zenon leachate analysis from 8 locations and the visual observations by Kehoe and BAR by which to estimate an area of surface contamination. This indicated the presence of hazardous wastes in some specific areas but was not detailed enough to allow any quantification of the material.
- o A magnetometer survey by the MOE indicated anomalies throughout the site. Consequently, no specific areas could be targeted as possibly containing drums, etc.
- o Groundwater samples taken in 1985 indicated a presence of lead and cadmium above drinking water quality criteria.
- o This data was used as part of the basis for preparation of the "Proposal for the Development of a Remediation Plan for the Former Lax Property" (CANVIRO, 1988b).

## 2.7 CANVIRO Hydrogeological Assessment

CANVIRO have as part of another study conducted some preliminary hydrogeological assessment work and prepared a draft report (CANVIRO, 1988c) describing findings to date.

Some of the major conclusions that were contained in this report are given below:

1. Evidence of industrial wastes, randomly mixed with clean fill was found throughout the entire 14.4 metres of fill material. However, the wastes which are of concern and require removal by the MOE are the bulk surface waste deposits which exceed MOE Regulation 309 criteria.





2. Groundwater flow occurs primarily within the fill materials due to their higher hydraulic conductivity relative to the underlying native soils.
3. Lateral groundwater flow occurs radially, in all directions, emanating from the centre of the site with eventual discharge to Hamilton Harbour around the perimeter of the site.
4. A number of inorganic and organic chemicals were detected in groundwater but only cadmium, zinc, iron, phosphorus and PCBs exceeded the recommended Ontario surface water quality criteria. Of these:
  - i) cadmium and zinc exceeded the guidelines in only one instance by a very marginal amount in a well which is screened in native soils, not fill materials
  - ii) iron exceeded the guideline only in two wells in the native soils and none in fill materials suggesting that it occurs naturally or does not originate from the fill
  - iii) phosphorus is of concern primarily because it is a nutrient which promotes growth of aquatic plants. It is not toxic to aquatic life or the environment in general
  - iv) PCBs are the only parameter that exceeded the guideline at most locations and that are potentially toxic to aquatic life. However, reported concentrations, which are from unfiltered samples, may be misleading and require confirmation through further analysis. Resampling and analyses for filtered PCBs has been undertaken and results will be available by early April 1989.
5. Chemical analyses of groundwater for the indicators, Dissolved Organic Carbon (TOC), and Total Organic Halogen (TOX), suggest that dissolved organic chemicals, both halogenated and non-halogenated, which have not yet been analyzed to date, may exist in the groundwater. This includes chemicals in the Base/Neutral Extractable and Acid Extractable groups.
6. Groundwater quality in 1988 was comparable to or better than that observed in previous testing by the Ministry of the Environment in 1985 and 1986.





7. Average 1988 concentrations in the groundwater in the fill at the site exceeded average values in Hamilton Harbour for zinc, lead and iron. However, the flux (kg/year) of these pollutants emanating from the Former Lax Property is negligible relative to other documented sources of pollutants to the Harbour. The concentrations and flux for PCBs are presently being assessed.
8. Covering of the site with a low permeability soil such as clay, together with positive surface water drainage and groundwater monitoring was selected as the most appropriate remediation method to address groundwater contamination, given the current understanding of site conditions. (A short term monitoring program is incorporated into this Remediation Plan, while a long term monitoring program will be part of the Environmental Assessment and Section 45).
9. An immediate confirmatory characterization of groundwater consisting of confirmatory analysis of selected parameters (particularly PCBs) and broader characterization of groundwater for previously unanalyzed contaminants (including base/neutral extractable and acid extractable organics) is necessary to fully assess the impact of contaminated groundwater at this site. This activity is presently awaiting authorization from the City of Hamilton.





### 3.0 SURFACE INVESTIGATION PROGRAM

#### 3.1 General

This Chapter describes the initial surface sampling conducted by CANVIRO on the Former Lax Property, the development of visual criteria used to determine the quantity and extent of contamination, the survey work, the test pit and test trench excavations, additional sampling, and the development of waste material quantities requiring removal from the site.

The sample locations, test pit and test trench locations, the base line established by the survey, and the locations of waste requiring removal are shown on Drawing 1 (at the back of this report).

The sample characteristics are summarized on Table 3.1 and further detail is provided in Appendix A on sample information sheets. The leachate analysis data is provided in Appendix B on lab data sheets. Lead and cadmium concentrations were found to be the only wastes exceeding Regulation 309 criteria for leachate toxic waste or hazardous waste.

#### 3.2 Initial Surface Sampling

On November 8, 1988, twenty-nine surface samples of industrial waste were collected from Areas 1 through 7. The majority of these samples were collected from Areas 1, 2, and 3. The sampling results are discussed in Section 3.2.1 and 3.2.2.

##### 3.2.1 Sample Descriptions

Six major waste types were identified from the twenty-nine samples collected. These waste types are described on Table 3.1 and identified throughout this report as Waste Type 1, Waste Type 2, Waste Type 3, etc.

##### 3.2.2 Sample Analysis and Visual Criteria Development

Twenty-four of the previously described twenty-nine waste samples were submitted to CANVIRO Analytical Laboratories in Kitchener and an ICAP (metals scan) analysis was conducted on leachate generated in accordance with Regulation 309 extraction procedure. The scan included analyses for aluminum, boron, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, silver, sodium, vanadium, zinc, phosphorus and strontium. The lead and cadmium concentrations are summarized in Table 3.2. Samples with lead concentrations higher than 5.0 mg/L and cadmium concentrations higher than 0.5 mg/L were considered as requiring removal, in accordance with Reg. 309 for leachate toxic or hazardous waste.





Table 3.1  
WASTE TYPE CHARACTERISTICS

| <u>Waste Type</u> | <u>No. of Samples from Initial Surface Sampling</u> | <u>Description</u>                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                 | 14                                                  | When dry the material varied from royal blue to dark brown and black in colour exhibiting a hard crumbly texture. When moist the material varied from dark brown to black in colour and was fine grained and cohesive. When pinched between the thumb and forefinger it left a thin, dark brown film that was difficult to remove. This material has been called "iron oxide" or "flue dust" by previous investigators. |
| 2                 | 6                                                   | This is a coarse, granular material with various concentrations of brown, rust and gray particles. One common characteristic among all samples was the presence of bluish-gray particles. This material has been referred to as "copper sulphate" material by other previous investigators.                                                                                                                             |
| 3                 | 5                                                   | This is a brown to black coarse granular non-cohesive material similar to foundry sand.                                                                                                                                                                                                                                                                                                                                 |
| 4                 | 2                                                   | This is a light to medium brown brick or brick material.                                                                                                                                                                                                                                                                                                                                                                |
| 5                 | 2                                                   | This is comprised of flakes and grains of rusty metallic slag like material and is wine red and rusty in colour.                                                                                                                                                                                                                                                                                                        |
| 6                 | 1                                                   | This is a fine grained reddish clay-like material.                                                                                                                                                                                                                                                                                                                                                                      |





Table 3.2  
LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED  
FROM THE FORMER LAX PROPERTY

| Sample No. | Waste Type* | Cadmium Concentration<br>(mg/L) | Lead Concentration<br>(mg/L) |
|------------|-------------|---------------------------------|------------------------------|
| S0         | 3           | <0.012                          | <0.10                        |
| S1         | 3           | <0.012                          | <0.10                        |
| S2         | 2           | 1.16                            | 27.5                         |
| S3         | 4           | 0.017                           | 0.21                         |
| S4         | 4           | 0.029                           | <0.10                        |
| S5         | 1           | 6.74                            | 7.88                         |
| S7         | 1           | 5.51                            | 39.5                         |
| S8         | 2           | 0.732                           | 4.37                         |
| S9         | 1           | 9.28                            | 18.8                         |
| S10        | 1           | 2.16                            | 57.9                         |
| S11        | 3           | 0.012                           | <0.10                        |
| S12        | 1           | 1.20                            | 3.50                         |
| S14        | 3           | <0.012                          | <0.10                        |
| S15        | 5           | 0.022                           | <0.10                        |
| S17        | 1           | 21.5                            | 36.0                         |
| S19        | 1           | 7.21                            | 6.07                         |
| S21        | 1           | 6.90                            | 8.66                         |
| S22        | 1           | 1.10                            | 19.0                         |
| S23        | 6           | 0.041                           | 0.58                         |
| S24        | 2           | 0.112                           | 7.78                         |
| S25        | 2           | 2.03                            | 81.6                         |
| S26        | 2           | 1.77                            | 38.3                         |
| S28        | 1           | 6.92                            | 7.52                         |
| S29        | 1           | 8.25                            | 4.66                         |

Registrable Solid  
Waste (if greater  
than) mg/L

0.05

0.5

Leachate toxic waste  
or hazardous waste  
(if greater than) mg/L

0.5

5.0

\* Refer to Table 3.1 for waste type descriptions.





Table 3.2 shows that Waste Types 1 and 2 were identified as requiring removal in accordance with the Regulation 309 criteria for lead and cadmium. The waste type descriptions were used as the visual criteria which was subsequently used in the field to identify and quantify the amount and extent of industrial waste requiring removal in Areas 1 through 7 at the Former Lax Property.

This visual criteria will also be used when the material identified is being removed from the site for disposal.

### 3.3 Survey Work

There were two survey tasks required at the Former Lax Property:

- o to establish a baseline in order to accurately reference locations at the site.
- o to quantify the amount of clay in the stockpile. To accomplish this task, cross-sections were taken at various locations across the stockpile.

#### 3.3.1 Establishing Baseline

CANVIRO surveyed the Former Lax Property site using a Sokkisha transit and electronic distance meter to establish a fifty metre baseline grid throughout the site. Once the baseline was established, the locations of samples, test trenches, and test pits were accurately mapped (see Drawing 1 at back of report).

#### 3.3.2 Clay Stockpile Survey

The stockpile of clay-like material was surveyed on November 28, 1988 to determine its quantity. It was estimated the stockpile contained 34,000 m<sup>3</sup> of clay, based on the assumptions that the entire stockpile is composed of the same type of material and that the stockpile was placed on flat land. This will provide sufficient material to place a 20 - 25 cm soil cover over the the entire site. It is planned to use this material for the low permeability soil cover provided it can achieve hydraulic conductivity of 10<sup>-7</sup> cm/sec or less.

### 3.4 Test Pit, Test Trenches and Additional Sampling

Once the two waste types requiring removal were identified, CANVIRO retained a contractor with two JSW BH 70 backhoes to determine the waste limits. From November 17 to November 24, 1988, test trenches and test pits were dug in Areas 1





through 7, in an effort to determine the extent and quantity of Waste Types 1 and 2 as well as to investigate the magnetic anomalies and the north and south peninsulas. This was in accordance with the Proposal for Development of a Remediation Plan for the Former Lax Property (CANVIRO, 1988b).

During and after test trenching, twenty-seven further waste samples were taken, and the leachate extracted from these in accordance with Regulation 309 was analyzed. Some of these samples were used to prove that apparently 'clean' fill adjacent to the limits of identified industrial waste in each area did not exceed Regulation 309 criteria. These included samples S35, S36, S45, S47, S48, S50, and S51. Other samples were taken to confirm or deny the presence of material requiring removal at specific locations. These included samples S30-S34, MA5, NP1-NP3, SP1, SP3, S37-S44, S46, S49, and S52. Sample descriptions and results of these analyses are presented in Appendix A and Appendix B, respectively.

The work conducted in Areas 1 to 7, at the magnetic anomaly locations, and at the north and south peninsulas is summarized in this section. CANVIRO personnel estimated the amount of material to be removed from each area, based on the actual in situ volume of contaminated material, as well as 15 cm of 'clean' material below the actual contaminated pocket or seam, and 15 cm above the pocket or seam (if located under clean fill). The 15 cm was considered the minimum amount of material that would be removed along with contaminated waste when excavation with heavy equipment was employed.

The quantities requiring removal for each specific area are summarized below in Table 3.3 and described immediately following the table. The locations are shown in Drawing 1 (at the back of the report).

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Table 3.3  
ESTIMATED QUANTITIES FOR REMOVAL FROM  
THE FORMER LAX PROPERTY

| <u>Area</u>                | <u>Volume to be Removed (cubic metres)</u> |
|----------------------------|--------------------------------------------|
| Area 1                     | 2620                                       |
| Area 2                     | 2870                                       |
| Area 3                     | 790                                        |
| Area 4                     | 30                                         |
| Area 5                     | 610                                        |
| Area 6                     | 370                                        |
| Area 7                     | <u>1740</u>                                |
| Total Volume to be Removed | 9030                                       |

---





### Area 1

A total of 23 trenches were dug in Area 1. Test trenching began at the west end of the area and continued east. The trenches varied from 0.3 to 1.5 m deep. Only surface deposits of Waste Type 1 were encountered.

Very little surface cover was found in Area 1. One narrow seam (30 cm) was found to continue under the clay stockpile at sample location S50. On December 13, 1988, CANVIRO, the MOE, BAR and the City of Hamilton made an onsite inspection of the test trenching. A decision was made at that time that this seam did not require further pursuit and that removals would not be required past this location.

The estimated quantity of material requiring removal from Area 1 was determined to be 2620 cubic metres.

### Area 2

Waste Type 1 was the primary waste at the north end of Area 2, but as excavation trenching progressed southward, more Waste Type 2 was encountered. A total of 21 test trenches were excavated in Area 2. The thicknesses of the wastes varied significantly throughout the area, often covered with various layers of 'clean' fill. The limit to one seam of Waste Type 1 which extended under the toe of the clay stockpile was not found. This seam was 1 m thick and 12 m wide and for purposes of developing a total volume, the length of the seam was estimated to be 16 m long. This seam was located directly north of Sample S25. On December 13, 1988 at the site, it was determined by the MOE that this seam must be pursued and removed at the time of waste removal. The test trenching depth throughout the area varied between 0.3 to 3 m.

The estimated quantity of material requiring removal from Area 2 is 2870 cubic metres. This includes an allowance of 200 cubic metres for the seam described above for which the length was not identified.

### Area 3

Test trenches in this area were excavated from 1 to 3 metres deep to determine the quantities and the extent of material requiring removal. Each trench was numbered 1 to 6 as shown on Drawing 1. One long circular trench around the perimeter of Area 3 was excavated at the end of the investigation to ensure that all major seams had been identified and that the limits of wastes requiring removal were found. The deposit here in Area 3 contained both Waste Type 1 and Waste Type 2.





The estimated quantity of material requiring removal from Area 3 is 790 cubic metres.

#### Area 4

From test trenches to the north, south, east and west, a small surface deposit of Waste Type 1 was found in Area 4. A small 10 cm thick seam of Waste Type 1 extended into a 3 m high hill to the west before it tapered off and terminated 11 m into the hill.

The estimated quantity of material requiring removal from Area 4 is 30 cubic metres.

#### Area 5

The majority of surface waste in Area 5 consists of a thin layer of Waste Type 1 and Waste Type 2 within 25 cm of the ground surface. At the south end, however, a 3 metre deep deposit of waste material was found. Portions of several metal barrels containing Waste Type 2 were discovered lying near a deposit of Waste Type 1 that extended into the hill side. The Waste Type 1 seam that extended into the slope tapered off to a thickness of 7 to 10 cm from approximately 45 cm at the start of the slope. The limits of the Waste Type 1 seam were not found. However, based on the narrowness of this seam, the MOE agreed on December 13, 1988 that further pursuit of this material would not be necessary. Where excavation was halted, this seam of Waste Type 1 was under 3-4 m of clean fill.

The estimated quantity of material requiring removal from Area 5 is 610 cubic metres.

#### Area 6

An exposed bulk deposit of Waste Type 1 at Area 6 was further investigated. Six test trenches were excavated to determine the limits of the deposit. Some Waste Type 1 deposition continued up the slope to the north of the area but its limits were found. The aerial extent of the waste in this area can be seen on Drawing 1.

The estimated quantity of material requiring removal from Area 6 is 390 cubic metres.

#### Area 7

Test trenches from 0.5 to 3.0 m deep were excavated to determine the limits of the waste requiring removal. Both Waste Type 1 and Waste Type 2 were identified with





some of the waste buried under 0.3 to 1.0 m of clean fill. Area 7 was found to extend north and connect to Area 2. An arbitrary line was placed between Area 2 and Area 7 to delineate the areas and the waste contained within each.

The estimated quantity of material requiring removal from Area 7 is 1740 cubic metres.

### Magnetic Anomalies

The two major magnetic anomalies which were identified by an earlier MOE magnetometer survey were investigated. Personnel from MOE and CANVIRO marked out the locations of the two anomalies on November 17, 1988 to allow for test pit trenching in these areas.

In total, 6 magnetic anomaly pits were excavated to a depth of three to four metres. These pits are shown on Drawing 1 (MA1 to MA6). Only one pit contained black granular industrial waste which was then sampled and analyzed (MA5). The results indicated that this waste type did not require removal (see Appendix B).

### North and South Peninsulas

Three, 3 metre deep test pits were excavated on each peninsula. The six test pits did not reveal any deposition of Waste Type 1 or Waste Type 2. However, some other waste deposits were encountered and five of these deposits labeled NP1, NP2, NP3, SP1 and SP3 were sampled and analyzed. The sample description can be found in Appendix A. The analysis of the leachate obtained from these samples in accordance with Regulation 309, indicated that these waste types did not require removal.

As noted in Table 3.3, the total quantity for removal was 9030 cubic metres. For costing purposes, a bulking factor of 20 percent (in situ volume to truck box volume) and conversions factor of 1.30 cubic yards/cubic metres and 1.35 tons/cubic yards (obtained from Philip Enterprises) were used. When converted to tons, which is what the costing in the subsequent section is based on, this results in a total of 19,140 tons of waste requiring removal. Tons were used because the preliminary cost information received from contractors was in these units. For consistency, Imperial units have been used in Chapter 4.0 when costs are discussed and also for the conclusions in Chapter 5.0.





A further meeting was held in January 1989 with the MOE to determine if some of the material such as the material located in Area 2, which was under "clean" material, or the material in Area 7, which would be covered with a parking lot and confined with a breakwater along the shore, could remain onsite. This would have reduced the quantities to be removed by over 1,000 cubic metres. After review, the MOE made a decision that this material would have to be removed. Consequently, 19,140 tons of waste material to be removed is the quantity to be used for pricing.

The recommended remediation plan will also include the following:

1. A short-term (three-year) groundwater monitoring program for the site.

2. The placement of a low permeability soil cover over the site.

3. Contingency measures to install facilities to contain, collect and treat the contaminated groundwater, if it is later shown to be necessary.

4. Considerations for future development.

The groundwater monitoring plan is scheduled to begin in the spring of 1989, with the low permeability soil cover to be placed during the proposed development of the site. The groundwater monitoring plan is discussed in Section 4.3. The placement of the low permeability soil cover is discussed in Section 4.4, and contingency measures are discussed in Section 4.5 and considerations for future development are discussed in Section 4.6.

#### 4.7 Removal and Disposal of Contaminated Material

Two acceptable means of removal and disposal of the wastes identified for removal have been identified by CMRAC.





## 4.0 DEVELOPMENT OF REMEDIATION PLAN

### 4.1 General

The recommended remediation plan is composed of two major activities: the first being the specifications for removal of the 19,140 tons of material identified by the work described in Chapter 3; the second being the integration of the remediation plan which involves covering the site with a low permeability soil such as clay, together with positive surface water drainage and groundwater monitoring. This was a preliminary recommendation of the CANVIRO draft Hydrogeological Study Report (CANVIRO, 1988c).

The removal of the 19,140 tons of waste material is discussed in Section 4.2. A telephone conversation with Mr. H. Lim of the MOE (Lim, 1989) indicated that the application submitted by the City of Hamilton for removals of this material in 1986 would in all likelihood be used in 1989 and that re-registration would not be required. That being the case, the City of Hamilton generator number would remain the same and the waste classification would remain as 143T.

The recommended remediation plan will also include the following:

- o A short-term (two-year) groundwater monitoring program for the site
- o The placement of a low permeability soil cover over the site.
- o Contingency measures to install facilities to contain, collect and treat the contaminated groundwater, if it is later shown to be necessary.
- o Considerations during future development

The groundwater monitoring plan is scheduled to begin in the Spring of 1989, with the low permeability soil cover to be placed during the proposed development of the site. The groundwater monitoring plan is discussed in Section 4.3, the placement of the low permeability soil cover is discussed in Section 4.4, the contingency measures are discussed in Section 4.5 and considerations for future development are discussed in Section 4.6.

### 4.2 Removal and Disposal of Contaminated Material

Two acceptable means of removal and disposal of the wastes designated for removal have been identified by CANVIRO.





They are as follows:

- o Excavating, loading and hauling the designated waste material, as is, to a solid waste disposal site which is licenced for hazardous materials.
- o Excavating, loading and hauling the designated waste material, as is, to a facility to stabilize the material, then subsequently loading and hauling the stabilized material to a solid industrial waste disposal site.

These alternatives are similar to those presented in the proposal (CANVIRO, 1988b) prepared for this work.

The decision on which of the two disposal alternatives to select will be based primarily on costs obtained during the tendering process. The general specifications for the on-site activities associated with removal of the waste materials are discussed below.

Immediately prior to any excavation in Areas 1 through 7, individuals representing the contractor selected to do the work and the City of Hamilton's representative (tentatively slated to be CANVIRO) will meet at each area to discuss the specific material which is to be removed. The representative from the City of Hamilton will, with the visual criteria developed in Chapter 3, indicate to the contractor's representative the specific material which is to be removed. The contractor will then proceed with the bulk excavation of the material under the supervision of the City's representative.

The excavation of the contaminated material will be with hydraulic backhoes. The backhoe will load the material into haulage vehicles for disposal offsite. These haulage vehicles will be tractor-trailer units and will have the proper licencing and placarding to haul waste material having the waste classification 143T. It will be necessary for each load that leaves the site to have a manifest which designates the waste generator, hauler and receiver. The generator section of the manifest will be completed onsite by the City of Hamilton representative, the hauler section will be completed by the Contractor and the receiver section by the disposal site or stabilization facility.

The haulage vehicles will be equipped with sealed tailgates and be completely tarped to prevent any spillage or loss of material on route to its destination. Prior to leaving the site, the vehicle will pass through a decontamination facility to ensure that no loose material is on the trailer box and to ensure that the tires are free of waste material. The decontamination facility will be equipped with a high pressure spray washer and with facilities to contain and treat either on-site or off-site any associated washwater.





Workers at the site will be required to wear standard work clothing which will include, but not necessarily be limited to safety shoes, hard hats, gloves and safety glasses. A safety orientation will be provided by to each site worker before beginning the excavation work. This safety orientation will be provided by an individual trained in industrial hygiene and safety.

Backfilling of the excavated areas is not considered necessary at this time as some of the excavated areas may be used as service trenches in the future. All of these areas will eventually be covered in accordance with the soil cover requirements discussed in Section 4.4.

The costs for the removal and disposal of this material are estimated at \$2.9 - 3.5 million and are summarized on Table 4.1. The time required to complete this work is estimated at 6 - 10 weeks. The actual time will be dependent on the number of haulage vehicles that are used by the contractor. This work should be conducted in late Spring to early Fall to avoid weather related problems and possible additional costs.

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Table 4.1  
ESTIMATED COSTS FOR DESIGNATED WASTE MATERIAL REMOVAL

| Item                                                         | Units | Quantity | Unit Cost<br>Range<br>\$ | Total Cost<br>Range<br>(\$000's) |
|--------------------------------------------------------------|-------|----------|--------------------------|----------------------------------|
| Excavate, remove and dispose of contaminated material        | tons  | 19,140   | 150-180                  | 2850-3400                        |
| Site engineering includes inspection and engineering support | LS    |          |                          | 50-100                           |
| Total Cost*                                                  |       |          |                          | 2900-3500                        |

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\* The cost estimate for this removal is based on the work being completed in the spring and summer of 1989. It is noted here that one firm has had two 20 percent disposal cost increases over the past 12 months. It is also noted that the contractors were hesitant to provide anything but approximate cost estimates for this work. These cost estimates did provide for cleaning haulage vehicles, decontamination facility, mobilization, etc.

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#### 4.3 Groundwater Monitoring Program of Remediation Plan

This monitoring program assumes that any additional sampling and analysis for confirmatory purposes and long term monitoring described in the hydrogeological assessment (CANVIRO 1988c) will be carried out separately under the conditions of the Environmental Assessment and Section 45. The Remediation Plan includes only a short-term (two-year) monitoring program which will assist with the following:

- o determination of groundwater quality at the perimeter of the Lax site
- o confirmation of groundwater flux to the Hamilton Harbour
- o identification of any major changes in the groundwater conditions

The groundwater monitoring plan will be composed of collecting groundwater samples from four selected monitoring wells at the perimeter of the site four times a year for two years. The selected monitoring wells were shown previously on Figure 1.2. Specifically they are monitoring wells C-2, C-3, C-6 and M 13.

The groundwater from the four selected wells will be analyzed for the following:

- o lead, cadmium, chromium, nickel and zinc
- o pH, temperature and conductivity
- o filtered PCBs

In addition, the level of water will be measured at each of these monitoring wells. The water levels will also be measured at other monitoring wells on the site to assist with determination of hydraulic flux.

Results of the analysis will be distributed to the Ministry of the Environment, the City of Hamilton and BAR Environmental as soon as they are available.

The cost for the sampling and analysis work described above is estimated at \$25,000 - \$30,000.

#### 4.4 Low Permeability Cover

As noted in Section 4.1, a low permeability cover is required to minimize infiltration of surface water and to protect the public from direct contact. This cover will be





placed in a manner which will provide a positive surface drainage pattern to the harbour from the site. The incorporation of the positive storm drainage should not present any significant problems as the general topography which exists at the site slopes to the harbour and can therefore be readily adopted into the final design.

Two types of low permeability covers are proposed for the site. These include a cover of asphalt in the parking areas and a low permeability soil cover in other areas.

Preliminary indications are that parking will occupy approximately 5 percent of the site. This leaves 95 percent which will require a low permeability soil cover. Based on March 7, 1989 telephone conversations with J. Rayner and J. Vogt of the MOE (Rayner, 1989) (Vogt, 1989), the proposed cover is to be composed of 24 inches (600 mm) of clay material having hydraulic permeability of  $10^{-7}$  cm/sec. or less, and overlain by 6 to 8 inches (150 to 200 mm) of topsoil. The area would then be seeded to establish a grass cover. This is provided that the site is developed as parkland. No low permeability cover is proposed for below water level as infiltration is not considered a factor in this area.

Any buildings, services or landscaping for the proposed development will need to be incorporated with the 24 inch (600 mm) clay layer. This is discussed further in Section 4.6.

The total cost in 1989 dollars for the low permeability soil cover complete with topsoil and grass cover is estimated as \$1.656 - 2.455 million. A summary of this cost is given in Table 4.2. It is noted that some of the site preparation, grading, topsoil and seeding costs would have been incurred in the development of the site. The total of these are estimated as \$430,000 (\$50,000 for site preparation and site grading, \$300,000 for topsoil supply and placement and \$80,000 for seeding). Therefore, the soil cover costs directly associated with the industrial waste range from \$1,226,000 - \$2,025,000.

Placement of the soil cover is scheduled to take place in conjunction with the proposed development of the site which is presently scheduled for 1991 or 1992. This will eliminate the problem of damaging the cover during construction.

#### 4.5 Contingency Measures for Groundwater Remediation

Contingency measures for groundwater remediation were discussed in the draft hydrogeological assessment report (CANVIRO 1988c) for the site, in the event the MOE determine that a serious impact is being placed on the harbour, based





Table 4.2  
SOIL COVER COSTS

|                                                  | Unit | Quantity | Unit Cost<br>Range 3 | Total Cost                      |
|--------------------------------------------------|------|----------|----------------------|---------------------------------|
| Site preparation<br>and site grading             | s.y. | 160,000  | 0.50                 | 80,000                          |
| Supply clay for<br>soil cover <sup>1</sup>       | c.y. | 107,000  | \$1.00-<br>\$8.00    | 107,000-<br>856,000             |
| Place and compact<br>clay soil cover             | c.y. | 107,000  | 7.00                 | 749,000                         |
| Supply and place<br>6" - 8" topsoil              | c.y. | 36,000   | 15.00                | 540,000                         |
| Seeding                                          | s.y. | 160,000  | 0.50                 | 80,000                          |
| Engineering Design<br>& Construction<br>Services | L.S. |          |                      | 100,000-<br>150,000             |
| TOTAL COST <sup>2</sup>                          |      |          |                      | <hr/> \$1,656,000-<br>2,455,000 |

<sup>1</sup> This will be dependent on whether the City can obtain suitable clay material at little or no cost or whether clay has to be imported. An allowance has been made for stockpiled material described in Chapter 3.

<sup>2</sup> Total Cost in 1989 dollars

<sup>3</sup> Unit costs include for all overhead items, etc. and thus may appear high.

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on the results of the short term and long term monitoring results. These contingency measures provide facilities to contain, collect and dispose of contaminated groundwater. For groundwater containment, a vertical hydraulic barrier (ie. slurry wall or equivalent) would be installed around the perimeter of the site. This barrier would be keyed into the native soils at the base and into the clay cover at the surface. As such, groundwater would be essentially contained within the site.

Groundwater within the site would be collected using a tile drain or equivalent collection system located around the perimeter of the site on the inside of the vertical barrier. The purpose of the drain would be not only to collect groundwater but to maintain a net inward hydraulic gradient from the harbour to the site, thus further reducing the potential for movement of contaminated groundwater beyond the bounds of the site.





Groundwater would be treated and discharged in accordance with municipal, provincial and federal regulations. Treatment could occur onsite as pretreatment prior to sanitary sewer discharge, or treated water could be discharged directly to the harbour, if it met discharge criteria. Alternatively, treatment could take place solely at the municipal sewage treatment plant, if this was acceptable to the City and MOE.

The sampling test pit work discussed in Chapter 3 indicated that there does not appear to be a problem on either the north or south peninsula and therefore, a slurry wall for this area was not included in the following cost estimates. The perimeter of the balance of the site is approximately 1600 metres. A preliminary cost estimate of \$100 - \$125 per square metre was received over the telephone for slurry wall installation from Bermingham Construction. Using an average depth of 9 metres, the resultant cost based on the above unit cost estimate would be \$1,440,000 to \$1,800,000. An estimate of 30 - 40 days was given for this work. In addition to the slurry wall costs, costs for the perimeter drain, associated sumps and pump stations (assuming disposal to the sanitary sewer with treatment in the municipal sewage treatment plant) are estimated at \$300,000 - \$500,000. Engineering design costs for the work are estimated at \$150,000 - \$250,000. The total costs for the contingency groundwater collection and treatment system range from \$1,890,000 - \$2,550,000.

#### 4.6 Considerations During Site Development

Future excavation for the proposed site development should be avoided whenever possible. To accommodate this, it is understood that all proposed structures and buildings which require foundations below existing grade will have pile foundations which do not require excavation. It is also understood that no excavation will be conducted to form islands or other land forms.

For services or landscaping where excavation is normally required, the following is proposed:

- o placing services, trees, etc. in the trenches created by the removal of surface waste
- o placing services, trees, etc. on the existing surface and deepening the low permeability soil cover, where necessary.

However, if it is not possible to avoid some excavation, then some initial drilling or test digging should be conducted in the subject area. This could possibly prevent or





at least minimize any future removal requirements. If some future excavation cannot be avoided, site personnel associated with the excavation work should be outfitted in the work wear described in Section 4.2 and given a site safety orientation by an individual trained in industrial hygiene and safety.

The needs for any future excavation will depend on the proposed development scenario. However, the site development plan has not reached the stage where any future costs associated with buildings, services and landscaping can be estimated.

#### 4.7 Remediation Plan Summary

The remediation plan work has been divided into two phases: Phase 1 includes the Designated Waste Removal and Groundwater Monitoring and Phase 2 includes the soil cover. Costs for Phase 1 and Phase 2 are provided below in Table 4.3.

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Table 4.3  
SUMMARY OF REMEDIATION PLAN ACTIVITY COST AND SCHEDULING

| <u>Activity</u>                          | <u>Cost (\$000's)</u> | <u>Scheduled for</u>      |
|------------------------------------------|-----------------------|---------------------------|
| <u>Phase 1</u>                           |                       |                           |
| 1. Designated Waste Removal <sup>1</sup> | 2,900 - 3,500         | Spring - Summer 1989      |
| 2. Groundwater Monitoring                | 25 - 30               | Spring 1989 - Spring 1991 |
| <u>Phase 2</u>                           |                       |                           |
| 3. Soil Cover                            | <u>1,656 - 2,455</u>  | During Site Redevelopment |
| TOTAL PHASE 1 AND PHASE 2 COST           | 4,581 - 5,985         |                           |

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<sup>1</sup> A preliminary estimate of \$3.5 - 4.0 million for designated waste removal had been provided earlier by CANVIRO.

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Table 4.3 shows that the total cost for Phase 1 and 2 ranges from \$4,581,000 - \$5,985,000. It is noted here that this work is required for the site regardless of whether the proposed redevelopment of the site does or does not occur.





1. A summary of existing site investigation data indicated the presence of waste material exceeding MOE guidelines for decommissioning sites. As well, lead and cadmium were found in groundwater at concentrations exceeding drinking water criteria. However, the available information was not sufficient to allow for any quantification of material requiring removal.
2. Based on a decision agreed to between the Ministry of the Environment and the City of Hamilton, prior to initiating this project, "bulk surface deposits" exhibiting leachate characteristics that exceeded Regulation 309 criteria for leachate toxic or hazardous waste would require removal.
3. Samples were initially obtained from various bulk surface deposits of waste. These wastes were found to be of six types. Of these, only two were determined to exceed the removal criteria. These are described as follows:

#### Waste Type 1

When dry the material varied from royal blue to dark brown and black in colour exhibiting a hard crumbly texture. When moist the material varied from dark brown to black in colour and was fine grained and cohesive. When pinched between the thumb and forefinger it left a thin, dark brown film that was difficult to remove. This material has been called "iron oxide" or "flue dust" by other previous investigators.

#### Waste Type 2

This is a coarse, granular material with various concentrations of brown, rust and gray particles. One common characteristic among all samples was the presence of bluish-gray particles. This material has been referred to as "copper sulphate" material by other previous investigators.

These descriptions were adopted as the visual criteria to be used for the quantification of the waste requiring removal. They are also to be used during the actual waste removals.





4. Subsequent test pits and test trenches were excavated in Area 1 through Area 7. The results of this, along with the visual criteria discussed above were used to determine that the amount of material requiring removal is 19,140 tons.
5. Test pits and test trenches that were excavated in areas of magnetic anomalies and on the north and south peninsulas did not indicate the presence of Waste Type 1 and Waste Type 2. The waste types that were present were determined by sampling and analysis not to require removal.
6. The recommended remediation plan for the Former Lax Property site is composed of the following:
  - o removal of wastes (19,140 tons of material)
  - o a short-term (2-year) groundwater monitoring program
  - o a low permeability cover
  - o contingency measures for potential groundwater problems
7. The cost and scheduling for Phase 1 and Phase 2, which include designated waste removal, groundwater monitoring and soil cover are given on the table below. The total Phase 1 and Phase 2 cost ranges from \$4,581,000 - \$5,985,000.

| <u>Activity</u>                | <u>Cost<br/>(\$000's)</u> | <u>Scheduled for</u>      |
|--------------------------------|---------------------------|---------------------------|
| <u>Phase 1</u>                 |                           |                           |
| 1. Designated Waste Removal    | 2,900 - 3,500             | Spring - Summer 1989      |
| 2. Groundwater Monitoring      | 25 - 30                   | Spring 1989 - Spring 1991 |
| <u>Phase 2</u>                 |                           |                           |
| 3. Soil Cover                  | <u>1,656 - 2,455</u>      | During Site Redevelopment |
| TOTAL PHASE 1 AND PHASE 2 COST | 4,581 - 5,985             |                           |





The scheduling shown on the table above will allow the soil cover to be placed in conjunction with the proposed development. Earlier placement of the soil cover would cause it to be subject to substantial damage during development construction. It is noted, however, that if the proposed development does not go ahead, it will still be necessary to carry out the remediation plan.

8. The waste requiring removal will be bulk excavated into proper haulage vehicles for removal from the site. All haulage vehicles will be properly cleaned and secured before leaving the site as well as being properly placarded, licenced and manifested. The material will be disposed either directly to a landfill equipped to handle this type of waste or to a facility where this waste is stabilized and then disposed at a landfill site for industrial waste.
9. The short-term (two-year) groundwater monitoring program which is part of the recommended remediation plan will be comprised primarily of eight quarterly samplings of groundwater at four site perimeter monitoring wells. These samples will be analyzed for lead, cadmium, chromium, zinc, nickel, pH, conductivity, temperatures and PCBs. This monitoring will be used to complement additional work proposed in the hydrogeological assessment (CANVIRO 1988c) and to identify any significant changes in site conditions which could occur.
10. The low permeability soil cover for the site which will reduce infiltration and not allow direct contact with the site material will be composed of a 24 inch (600 mm) layer of clay material having hydraulic permeability of  $10^{-7}$  cm/sec or less, which shall be overlain with 6 to 8 inches (150 to 200 mm) of topsoil complete with grass cover.
11. The contingency measures for groundwater containment, collection and treatment are composed of a perimeter slurry wall complete with tile drain, sumps and pump systems with which to remove the groundwater. These measures will only be implemented if the MOE determines that a serious environmental impact is being placed on the harbour by the site. The cost estimate for these contingency measures ranges from \$1,890,000 to \$2,550,000.





12. The major consideration for work associated with the future development of the site is that excavation should be avoided whenever possible. It is understood that piles which do not require excavation will be used for foundations of buildings and structures. It is also understood that islands will not be created by excavation. It is recommended for services and landscaping, that alternative means of installation should be seriously investigated before excavation is considered.





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APPENDIX A

SAMPLE INVESTIGATION SHEETS





| Number | Description                |                                     | Material Characteristics        | Source  | Depth              | Location | Waste Type |
|--------|----------------------------|-------------------------------------|---------------------------------|---------|--------------------|----------|------------|
|        | Colour                     |                                     |                                 |         |                    |          |            |
| S-0    | Duplicate of S-1           |                                     |                                 |         |                    |          | 3          |
| S-1    | black                      | sandy                               | S.E. side of finger trench      | surface | Area 3             |          | 3          |
| S-2    | blue, brown, red, gray     | loose, granular                     | east side of finger trench      | surface | Area 3             |          | 2          |
| S-3    | light brown                | fine loose material                 | south west side of large trench | surface | Area 3             |          | 4          |
| S-4    | medium to light brown      | hard fine grained brick             | south west side of large trench | surface | Area 3             |          | 4          |
| S-5    | black                      | fine, loose (iron oxide)            | stockpile                       | surface | Area 6 (67N 428E)  |          | 1          |
| S-6    | black                      | fine, loose (iron oxide)            | stockpile                       | surface | Area 6 (65N 424E)  |          | 1          |
| S-7    | brown, black               | fine, loose (iron oxide)            | surface depression              | surface | Area 6 (68N 405E)  |          | 1          |
| S-8    | bluish-gray similar to S-2 | fine, loose                         | groundhog hole into west bank   | .2 m    | Area 5 (104N 254E) |          | 2          |
| S-9    | brown to black             | very fine, some clumps (iron oxide) | west side at foot of bank       | surface | Area 5 (129N 256E) |          | 1          |
| S-10   | dark gray, some stones     | fine, some clumps, clay like        | small pile from test trench     | surface | Area 5 (180N 253E) |          | 1          |
| S-11   | black                      | coarse, granular                    | former test exc.                | surface | (273N 270E)        |          | 3          |
| S-12   | brown                      | fine, somewhat clay like            | start of former trench          | surface | Area 1 (322N 333E) |          | 1          |
| S-13   | wine red, rust             | hard, metallic possibly a core butt | south side of trench            | surface | Area 1 (315N 333E) |          | 5          |





| Description |                                      |                                         |                                        |         | Waste<br>Type |
|-------------|--------------------------------------|-----------------------------------------|----------------------------------------|---------|---------------|
| Number      | Colour                               | Material Characteristics                | Source                                 | Depth   |               |
| S-14        | black                                | coarse, granular                        | north side of trench                   | surface | 3             |
| S-15        | Wine red                             | grainy, coarse pieces, crumbles readily | exposed earth                          | surface | 5             |
| S-16        | black                                | coarse, grain                           | exposed earth                          | surface | 3             |
| S-17        | dark brown                           | fine (iron oxide)                       | north of trench from small test trench | surface | 1             |
| S-18        | dark brown                           | fine (iron oxide)                       | north of trench from small test trench | surface | 1             |
| S-19        | dark brown                           | fine (iron oxide)                       | near large stockpile                   | surface | 1             |
| S-20        | dark brown                           | fine (iron oxide)                       | exposed earth                          | surface | 1             |
| S-21        | dark brown                           | fine (iron oxide)                       | from test excavation previously dug    | surface | 1             |
| S-22        | dark brown and reddish               | fine, clay-like in chunks               | stockpile                              | surface | 1             |
| S-23        | reddish                              | clay-like, fine                         | exposed earth                          | surface | 6             |
| S-24        | brown, streaks of blue               | fine                                    | surface                                | surface | 2             |
| S-25        | brown, similar to 24 streaks of blue | some coarse particles, primarily fine   | top of bank                            | surface | 2             |
| S-26        | brown, some blue                     | fine, sand like                         | side of previous exc. trench           | surface | 2             |





| Description |                                                          |                                    |                                               |          | Waste<br>Type |
|-------------|----------------------------------------------------------|------------------------------------|-----------------------------------------------|----------|---------------|
| Number      | Colour                                                   | Material Characteristics           | Source                                        | Depth    |               |
| S-27        | brown, some blue                                         | fine, sand like                    | side of previous exc. trench                  | surface  | 2             |
| S-28        | black                                                    | coarse, grained                    | top of trench                                 | surface  | 1             |
| S-29        | Duplicate of 19                                          |                                    |                                               |          | 1             |
| S-30        | grey-blue rust coloured                                  | granular chunky                    | SW corner of trench 2&4                       | 1 m      | 2             |
| S-31        | dark brown                                               | dry crumbly (iron oxide)           | WS corner of trench 2&4                       | .5 m     | 1             |
| S-32        | dark brown                                               | dry crumbly (iron oxide)           | NW corner of trench 2&3                       | .5-1.0 m | 1             |
| S-33        | dark brown                                               | wet clay like (iron oxide)         | bottom of large trench north of finger trench | surface  | 1             |
| S-34        | black with blue chunks                                   | coarse granular                    | SW corner of finger trench @ trench 1         | .2 m     | 2             |
| S-35        | grey-white - black                                       | coarse granular                    | SW corner of trench 1&3 limit of excavation   | 0.5 m    | *             |
| S-36        | black and brown                                          | granular sand                      | south end of trenching limit of excavation    | 0.75 m   | 3             |
| MA-5        | black foundry sand with brown coloured particles (small) | coarse granular                    | magnetic anomaly pit #5                       | 2 m      | 3             |
| NP-1        | light brown                                              | coarse granular material           | pit #1                                        | 1 m      | 4             |
| NP-2        | brown and black                                          | silty clay smells like shoe polish | pit #2                                        | 1 m      | *             |

\* No waste type classification





| Description |                                       |                                                              |                                           |         | Waste<br>Type |
|-------------|---------------------------------------|--------------------------------------------------------------|-------------------------------------------|---------|---------------|
| Number      | Colour                                | Material Characteristics                                     | Source                                    | Depth   |               |
| NP-3        | black with some<br>white foundry sand | foundry sand                                                 | pit #3                                    | 1 m     | 3             |
| SP-1        | black                                 | coarse sand                                                  | pit #1                                    | .6 m    | 3             |
| SP-3        | black                                 | loamy sand with white and<br>brown granular chunks           | pit #3                                    | .75 m   | 3             |
| S-37        | dark brown                            | granular and stoney<br>(iron oxide)                          | at entrance to<br>large trench            | surface | 1             |
| S-38        | black                                 | asphalt like<br>smell like asphalt                           | middle pit 1-4                            | .5 m    | *             |
| S-39        | royal blue                            | dry-clumped up like clay<br>(iron oxide)                     | 6 cm seam                                 | .4 m    | 2             |
| S-40        | dark brown                            | iron oxide                                                   | 0.3 m seam extending<br>into hill         | .75 m   | 1             |
| S-41        | brown with blue<br>sprinkles          | loam with stones and<br>blue sandy sprinkles                 | fill material below<br>S-40               | 1.0 m   | 2             |
| S-42        | royal blue                            | dry-crumblly (iron oxide)                                    | S side of exc. trench                     | .3 m    | 2             |
| S-43        | red                                   | clay-silty clay                                              | small stockpile                           | surface | 6             |
| S-44        | brown                                 | sand and stone fill with<br>clay and loam (assumed<br>clean) | south end of trench<br>1-1 @ toe of slope | .3-.6 m | *             |
| S-45        | black                                 | wet foundry sand                                             | south end of trench 1-4                   | .5 m    | 3             |
| S-46        | dark brown                            | iron oxide                                                   | .3 m seam at large<br>trench              | 2 m     | 1             |

\* No waste type classification





| Description |                           | Material Characteristics                                                                     | Source                                                           | Depth               | Location           | Waste Type |
|-------------|---------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------|--------------------|------------|
| Number      | Colour                    |                                                                                              |                                                                  |                     |                    |            |
| S-47        | black                     | sand with stones                                                                             | south trench 1-9                                                 | 2.5 m               | Area 1 (295N 495E) | *          |
| S-48        | light to medium brown     | clay                                                                                         | below S-47                                                       | 2.7 m               | Area 1 (295N 495E) | *          |
| S-49        | brown-black<br>royal blue | granular particles of<br>metallic slag mixed with<br>royal blue iron oxide and<br>brown loam | from test pit on path                                            | 0.2 m               | Area 5 190N 255E   | 2          |
| S-50        | royal blue                | dry-crumibly (iron oxide)                                                                    | south end of trench 1-8<br>under clay .3 m seam                  | 4 m                 | Area 1 (305N 475E) | 2          |
| S-51        | black and brown           | composite of 'clean'<br>black sand and brown clay                                            | north end of 1-6 at toe<br>of north slope limit of<br>excavation | .2-.3 m             | Area 1 (348N 452E) | *          |
| S-52        | dark brown                | iron oxide                                                                                   | north side of large<br>trench                                    | surface<br>to 0.1 m | (105N 530E)        | 1          |

\* No Waste Type Classification







APPENDIX B SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM THE LAX PROJECT

| IDENTIFICATION NO.                  | DATE    | LOCATION | DEPTH   | PH      | CONDUCTIVITY | TEMPERATURE | TOTAL SOLIDS | CHLORIDE |
|-------------------------------------|---------|----------|---------|---------|--------------|-------------|--------------|----------|
| 1001                                | 10/1/77 | 1001-01  | 1001-02 | 1001-03 | 1001-04      | 1001-05     | 1001-06      | 1001-07  |
| SUMMARY OF LEACHATE CHARACTERISTICS |         |          |         |         |              |             |              |          |
| 1001                                | 10/1/77 | 1001-01  | 1001-02 | 1001-03 | 1001-04      | 1001-05     | 1001-06      | 1001-07  |
| 1002                                | 10/1/77 | 1002-01  | 1002-02 | 1002-03 | 1002-04      | 1002-05     | 1002-06      | 1002-07  |
| 1003                                | 10/1/77 | 1003-01  | 1003-02 | 1003-03 | 1003-04      | 1003-05     | 1003-06      | 1003-07  |
| 1004                                | 10/1/77 | 1004-01  | 1004-02 | 1004-03 | 1004-04      | 1004-05     | 1004-06      | 1004-07  |
| 1005                                | 10/1/77 | 1005-01  | 1005-02 | 1005-03 | 1005-04      | 1005-05     | 1005-06      | 1005-07  |
| 1006                                | 10/1/77 | 1006-01  | 1006-02 | 1006-03 | 1006-04      | 1006-05     | 1006-06      | 1006-07  |
| 1007                                | 10/1/77 | 1007-01  | 1007-02 | 1007-03 | 1007-04      | 1007-05     | 1007-06      | 1007-07  |
| 1008                                | 10/1/77 | 1008-01  | 1008-02 | 1008-03 | 1008-04      | 1008-05     | 1008-06      | 1008-07  |
| 1009                                | 10/1/77 | 1009-01  | 1009-02 | 1009-03 | 1009-04      | 1009-05     | 1009-06      | 1009-07  |
| 1010                                | 10/1/77 | 1010-01  | 1010-02 | 1010-03 | 1010-04      | 1010-05     | 1010-06      | 1010-07  |
| 1011                                | 10/1/77 | 1011-01  | 1011-02 | 1011-03 | 1011-04      | 1011-05     | 1011-06      | 1011-07  |
| 1012                                | 10/1/77 | 1012-01  | 1012-02 | 1012-03 | 1012-04      | 1012-05     | 1012-06      | 1012-07  |
| 1013                                | 10/1/77 | 1013-01  | 1013-02 | 1013-03 | 1013-04      | 1013-05     | 1013-06      | 1013-07  |
| 1014                                | 10/1/77 | 1014-01  | 1014-02 | 1014-03 | 1014-04      | 1014-05     | 1014-06      | 1014-07  |
| 1015                                | 10/1/77 | 1015-01  | 1015-02 | 1015-03 | 1015-04      | 1015-05     | 1015-06      | 1015-07  |
| 1016                                | 10/1/77 | 1016-01  | 1016-02 | 1016-03 | 1016-04      | 1016-05     | 1016-06      | 1016-07  |
| 1017                                | 10/1/77 | 1017-01  | 1017-02 | 1017-03 | 1017-04      | 1017-05     | 1017-06      | 1017-07  |
| 1018                                | 10/1/77 | 1018-01  | 1018-02 | 1018-03 | 1018-04      | 1018-05     | 1018-06      | 1018-07  |
| 1019                                | 10/1/77 | 1019-01  | 1019-02 | 1019-03 | 1019-04      | 1019-05     | 1019-06      | 1019-07  |
| 1020                                | 10/1/77 | 1020-01  | 1020-02 | 1020-03 | 1020-04      | 1020-05     | 1020-06      | 1020-07  |
| 1021                                | 10/1/77 | 1021-01  | 1021-02 | 1021-03 | 1021-04      | 1021-05     | 1021-06      | 1021-07  |
| 1022                                | 10/1/77 | 1022-01  | 1022-02 | 1022-03 | 1022-04      | 1022-05     | 1022-06      | 1022-07  |
| 1023                                | 10/1/77 | 1023-01  | 1023-02 | 1023-03 | 1023-04      | 1023-05     | 1023-06      | 1023-07  |
| 1024                                | 10/1/77 | 1024-01  | 1024-02 | 1024-03 | 1024-04      | 1024-05     | 1024-06      | 1024-07  |
| 1025                                | 10/1/77 | 1025-01  | 1025-02 | 1025-03 | 1025-04      | 1025-05     | 1025-06      | 1025-07  |
| 1026                                | 10/1/77 | 1026-01  | 1026-02 | 1026-03 | 1026-04      | 1026-05     | 1026-06      | 1026-07  |
| 1027                                | 10/1/77 | 1027-01  | 1027-02 | 1027-03 | 1027-04      | 1027-05     | 1027-06      | 1027-07  |
| 1028                                | 10/1/77 | 1028-01  | 1028-02 | 1028-03 | 1028-04      | 1028-05     | 1028-06      | 1028-07  |
| 1029                                | 10/1/77 | 1029-01  | 1029-02 | 1029-03 | 1029-04      | 1029-05     | 1029-06      | 1029-07  |
| 1030                                | 10/1/77 | 1030-01  | 1030-02 | 1030-03 | 1030-04      | 1030-05     | 1030-06      | 1030-07  |
| 1031                                | 10/1/77 | 1031-01  | 1031-02 | 1031-03 | 1031-04      | 1031-05     | 1031-06      | 1031-07  |
| 1032                                | 10/1/77 | 1032-01  | 1032-02 | 1032-03 | 1032-04      | 1032-05     | 1032-06      | 1032-07  |
| 1033                                | 10/1/77 | 1033-01  | 1033-02 | 1033-03 | 1033-04      | 1033-05     | 1033-06      | 1033-07  |
| 1034                                | 10/1/77 | 1034-01  | 1034-02 | 1034-03 | 1034-04      | 1034-05     | 1034-06      | 1034-07  |
| 1035                                | 10/1/77 | 1035-01  | 1035-02 | 1035-03 | 1035-04      | 1035-05     | 1035-06      | 1035-07  |
| 1036                                | 10/1/77 | 1036-01  | 1036-02 | 1036-03 | 1036-04      | 1036-05     | 1036-06      | 1036-07  |
| 1037                                | 10/1/77 | 1037-01  | 1037-02 | 1037-03 | 1037-04      | 1037-05     | 1037-06      | 1037-07  |
| 1038                                | 10/1/77 | 1038-01  | 1038-02 | 1038-03 | 1038-04      | 1038-05     | 1038-06      | 1038-07  |
| 1039                                | 10/1/77 | 1039-01  | 1039-02 | 1039-03 | 1039-04      | 1039-05     | 1039-06      | 1039-07  |
| 1040                                | 10/1/77 | 1040-01  | 1040-02 | 1040-03 | 1040-04      | 1040-05     | 1040-06      | 1040-07  |
| 1041                                | 10/1/77 | 1041-01  | 1041-02 | 1041-03 | 1041-04      | 1041-05     | 1041-06      | 1041-07  |
| 1042                                | 10/1/77 | 1042-01  | 1042-02 | 1042-03 | 1042-04      | 1042-05     | 1042-06      | 1042-07  |
| 1043                                | 10/1/77 | 1043-01  | 1043-02 | 1043-03 | 1043-04      | 1043-05     | 1043-06      | 1043-07  |
| 1044                                | 10/1/77 | 1044-01  | 1044-02 | 1044-03 | 1044-04      | 1044-05     | 1044-06      | 1044-07  |
| 1045                                | 10/1/77 | 1045-01  | 1045-02 | 1045-03 | 1045-04      | 1045-05     | 1045-06      | 1045-07  |
| 1046                                | 10/1/77 | 1046-01  | 1046-02 | 1046-03 | 1046-04      | 1046-05     | 1046-06      | 1046-07  |
| 1047                                | 10/1/77 | 1047-01  | 1047-02 | 1047-03 | 1047-04      | 1047-05     | 1047-06      | 1047-07  |
| 1048                                | 10/1/77 | 1048-01  | 1048-02 | 1048-03 | 1048-04      | 1048-05     | 1048-06      | 1048-07  |
| 1049                                | 10/1/77 | 1049-01  | 1049-02 | 1049-03 | 1049-04      | 1049-05     | 1049-06      | 1049-07  |
| 1050                                | 10/1/77 | 1050-01  | 1050-02 | 1050-03 | 1050-04      | 1050-05     | 1050-06      | 1050-07  |
| 1051                                | 10/1/77 | 1051-01  | 1051-02 | 1051-03 | 1051-04      | 1051-05     | 1051-06      | 1051-07  |
| 1052                                | 10/1/77 | 1052-01  | 1052-02 | 1052-03 | 1052-04      | 1052-05     | 1052-06      | 1052-07  |
| 1053                                | 10/1/77 | 1053-01  | 1053-02 | 1053-03 | 1053-04      | 1053-05     | 1053-06      | 1053-07  |
| 1054                                | 10/1/77 | 1054-01  | 1054-02 | 1054-03 | 1054-04      | 1054-05     | 1054-06      | 1054-07  |
| 1055                                | 10/1/77 | 1055-01  | 1055-02 | 1055-03 | 1055-04      | 1055-05     | 1055-06      | 1055-07  |
| 1056                                | 10/1/77 | 1056-01  | 1056-02 | 1056-03 | 1056-04      | 1056-05     | 1056-06      | 1056-07  |
| 1057                                | 10/1/77 | 1057-01  | 1057-02 | 1057-03 | 1057-04      | 1057-05     | 1057-06      | 1057-07  |
| 1058                                | 10/1/77 | 1058-01  | 1058-02 | 1058-03 | 1058-04      | 1058-05     | 1058-06      | 1058-07  |
| 1059                                | 10/1/77 | 1059-01  | 1059-02 | 1059-03 | 1059-04      | 1059-05     | 1059-06      | 1059-07  |
| 1060                                | 10/1/77 | 1060-01  | 1060-02 | 1060-03 | 1060-04      | 1060-05     | 1060-06      | 1060-07  |
| 1061                                | 10/1/77 | 1061-01  | 1061-02 | 1061-03 | 1061-04      | 1061-05     | 1061-06      | 1061-07  |
| 1062                                | 10/1/77 | 1062-01  | 1062-02 | 1062-03 | 1062-04      | 1062-05     | 1062-06      | 1062-07  |
| 1063                                | 10/1/77 | 1063-01  | 1063-02 | 1063-03 | 1063-04      | 1063-05     | 1063-06      | 1063-07  |
| 1064                                | 10/1/77 | 1064-01  | 1064-02 | 1064-03 | 1064-04      | 1064-05     | 1064-06      | 1064-07  |
| 1065                                | 10/1/77 | 1065-01  | 1065-02 | 1065-03 | 1065-04      | 1065-05     | 1065-06      | 1065-07  |
| 1066                                | 10/1/77 | 1066-01  | 1066-02 | 1066-03 | 1066-04      | 1066-05     | 1066-06      | 1066-07  |
| 1067                                | 10/1/77 | 1067-01  | 1067-02 | 1067-03 | 1067-04      | 1067-05     | 1067-06      | 1067-07  |
| 1068                                | 10/1/77 | 1068-01  | 1068-02 | 1068-03 | 1068-04      | 1068-05     | 1068-06      | 1068-07  |
| 1069                                | 10/1/77 | 1069-01  | 1069-02 | 1069-03 | 1069-04      | 1069-05     | 1069-06      | 1069-07  |
| 1070                                | 10/1/77 | 1070-01  | 1070-02 | 1070-03 | 1070-04      | 1070-05     | 1070-06      | 1070-07  |
| 1071                                | 10/1/77 | 1071-01  | 1071-02 | 1071-03 | 1071-04      | 1071-05     | 1071-06      | 1071-07  |
| 1072                                | 10/1/77 | 1072-01  | 1072-02 | 1072-03 | 1072-04      | 1072-05     | 1072-06      | 1072-07  |
| 1073                                | 10/1/77 | 1073-01  | 1073-02 | 1073-03 | 1073-04      | 1073-05     | 1073-06      | 1073-07  |
| 1074                                | 10/1/77 | 1074-01  | 1074-02 | 1074-03 | 1074-04      | 1074-05     | 1074-06      | 1074-07  |
| 1075                                | 10/1/77 | 1075-01  | 1075-02 | 1075-03 | 1075-04      | 1075-05     | 1075-06      | 1075-07  |
| 1076                                | 10/1/77 | 1076-01  | 1076-02 | 1076-03 | 1076-04      | 1076-05     | 1076-06      | 1076-07  |
| 1077                                | 10/1/77 | 1077-01  | 1077-02 | 1077-03 | 1077-04      | 1077-05     | 1077-06      | 1077-07  |
| 1078                                | 10/1/77 | 1078-01  | 1078-02 | 1078-03 | 1078-04      | 1078-05     | 1078-06      | 1078-07  |
| 1079                                | 10/1/77 | 1079-01  | 1079-02 | 1079-03 | 1079-04      | 1079-05     | 1079-06      | 1079-07  |
| 1080                                | 10/1/77 | 1080-01  | 1080-02 | 1080-03 | 1080-04      | 1080-05     | 1080-06      | 1080-07  |
| 1081                                | 10/1/77 | 1081-01  | 1081-02 | 1081-03 | 1081-04      | 1081-05     | 1081-06      | 1081-07  |
| 1082                                | 10/1/77 | 1082-01  | 1082-02 | 1082-03 | 1082-04      | 1082-05     | 1082-06      | 1082-07  |
| 1083                                | 10/1/77 | 1083-01  | 1083-02 | 1083-03 | 1083-04      | 1083-05     | 1083-06      | 1083-07  |
| 1084                                | 10/1/77 | 1084-01  | 1084-02 | 1084-03 | 1084-04      | 1084-05     | 1084-06      | 1084-07  |
| 1085                                | 10/1/77 | 1085-01  | 1085-02 | 1085-03 | 1085-04      | 1085-05     | 1085-06      | 1085-07  |
| 1086                                | 10/1/77 | 1086-01  | 1086-02 | 1086-03 | 1086-04      | 1086-05     | 1086-06      | 1086-07  |
| 1087                                | 10/1/77 | 1087-01  | 1087-02 | 1087-03 | 1087-04      | 1087-05     | 1087-06      | 1087-07  |
| 1088                                | 10/1/77 | 1088-01  | 1088-02 | 1088-03 | 1088-04      | 1088-05     | 1088-06      | 1088-07  |
| 1089                                | 10/1/77 | 1089-01  | 1089-02 | 1089-03 | 1089-04      | 1089-05     | 1089-06      | 1089-07  |
| 1090                                | 10/1/77 | 1090-01  | 1090-02 | 1090-03 | 1090-04      | 1090-05     | 1090-06      | 1090-07  |
| 1091                                | 10/1/77 | 1091-01  | 1091-02 | 1091-03 | 1091-04      | 1091-05     | 1091-06      | 1091-07  |
| 1092                                | 10/1/77 | 1092-01  | 1092-02 | 1092-03 | 1092-04      | 1092-05     | 1092-06      | 1092-07  |
| 1093                                | 10/1/77 | 1093-01  | 1093-02 | 1093-03 | 1093-04      | 1093-05     | 1093-06      | 1093-07  |
| 1094                                | 10/1/77 | 1094-01  | 1094-02 | 1094-03 | 1094-04      | 1094-05     | 1094-06      | 1094-07  |
| 1095                                | 10/1/77 | 1095-01  | 1095-02 | 1095-03 | 1095-04      | 1095-05     | 1095-06      | 1095-07  |
| 1096                                | 10/1/77 | 1096-01  | 1096-02 | 1096-03 | 1096-04      | 1096-05     | 1096-06      | 1096-07  |
| 1097                                | 10/1/77 | 1097-01  | 1097-02 | 1097-03 | 1097-04      | 1097-05     | 1097-06      | 1097-07  |
| 1098                                | 10/1/77 | 1098-01  | 1098-02 | 1098-03 | 1098-04      | 1098-05     | 1098-06      | 1098-07  |
| 1099                                | 10/1/77 | 1099-01  | 1099-02 | 1099-03 | 1099-04      | 1099-05     | 1099-06      | 1099-07  |
| 1100                                | 10/1/77 | 1100-01  | 1100-02 | 1100-03 | 1100-04      | 1100-05     | 1100-06      | 1100-07  |
| 1101                                | 10/1/77 | 1101-01  | 1101-02 | 1101-03 | 1101-04      | 1101-05     | 1101-06      | 1101-07  |
| 1102                                | 10/1/77 | 1102-01  | 1102-02 | 1102-03 | 1102-04      | 1102-05     | 1102-06      | 1102-07  |
| 1103                                | 10/1/77 | 1103-01  | 1103-02 | 1103-03 | 1103-04      | 1103-05     | 1103-06      | 1103-07  |
| 1104                                | 10/1/77 | 1104-01  | 1104-02 | 1104-03 | 1104-04      | 1104-05     | 1104-06      | 1104-07  |
| 1105                                | 10/1/77 | 1105-01  | 1105-02 | 1105-03 | 1105-04      | 1105-05     | 1105-06      | 1105-07  |
| 1106                                | 10/1/77 | 1106-01  | 1106-02 | 1106-03 | 1106-04      | 1106-05     | 1106-06      | 1106-07  |
| 1107                                | 10/1/77 | 1107-01  | 1107-02 | 1107-03 | 1107-04      | 1107-05     | 1107-06      | 1107-07  |
| 1108                                | 10/1/77 | 1108-01  | 1108-02 | 1108-03 | 1108-04      | 1108-05     | 1108-06      | 1108-07  |
| 1109                                | 10/1/77 | 1109-01  | 1109-02 | 1109-03 | 1109-04      | 1109-05     | 1109-06      | 1109-07  |
| 1110                                | 10/1/77 | 1110-01  | 1110-02 | 1110-03 | 1110-04</    |             |              |          |







**CANVIRO**  
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SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S0<br>LEACHATE | S1<br>LEACHATE | S2<br>LEACHATE | S3<br>LEACHATE | S4<br>LEACHATE | S5<br>LEACHATE | REGISTERABLE<br>SOLID WASTE<br><br>(IF GREATER<br>THAN) | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE<br><br>(IF GREATER<br>THAN) |
|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------------------------------------------------|------------------------------------------------------------------------------|
| IDENTIFICATION NO. | 1641-01        | 1641-02        | 1641-03        | 1641-04        | 1641-05        | 1641-06        |                                                         |                                                                              |
|                    | CONCENTRATION  |                |                |                |                |                |                                                         |                                                                              |
|                    | mg/L           | mg/L           | mg/L           | mg/L           | mg/L           | mg/L           | mg/L                                                    | mg/L                                                                         |
| ALUMINUM           | 0.07           | 0.12           | 0.46           | 0.22           | 0.16           | 0.07           |                                                         |                                                                              |
| BORON              | 0.06           | 0.06           | 0.58           | 0.11           | 0.08           | 0.62           | 50.0                                                    | 500.0                                                                        |
| BARIUM             | 0.22           | 0.24           | 0.78           | 0.73           | 0.18           | 4.01           | 10.0                                                    | 100.0                                                                        |
| BERYLLIUM          | <0.005         | <0.005         | <0.005         | <0.005         | <0.005         | <0.005         |                                                         |                                                                              |
| CADMIUM            | <0.012         | <0.012         | 1.16           | 0.017          | 0.029          | 6.74           | 0.05                                                    | 0.5                                                                          |
| CALCIUM            | 80.2           | 112            | 251            | 1758           | 55.6           | 382            |                                                         |                                                                              |
| CHROMIUM           | <0.02          | <0.02          | <0.02          | <0.02          | <0.02          | <0.02          | 0.5                                                     | 5.0                                                                          |
| COBALT             | <0.03          | <0.03          | 0.03           | <0.03          | <0.03          | 0.14           |                                                         |                                                                              |
| COPPER             | <0.01          | <0.01          | 2.95           | 0.08           | 0.01           | 0.74           |                                                         |                                                                              |
| IRON               | 0.04           | 0.07           | 0.07           | <0.02          | 0.39           | 0.06           |                                                         |                                                                              |
| LEAD               | <0.10          | <0.10          | 27.5           | 0.21           | <0.10          | 7.88           | 0.5                                                     | 5.0                                                                          |
| MAGNESIUM          | 10.2           | 13.2           | 60.3           | 32.7           | 3.22           | 51.2           |                                                         |                                                                              |
| MANGANESE          | 1.30           | 0.96           | 3.03           | 5.80           | 0.41           | 5.19           |                                                         |                                                                              |
| NICKEL             | 0.07           | 0.05           | 0.40           | 0.51           | <0.01          | 0.59           |                                                         |                                                                              |
| SILVER             | <0.01          | <0.01          | 0.01           | 0.07           | <0.01          | 0.02           | 0.5                                                     | 5.0                                                                          |
| SODIUM             | 22.5           | 23.7           | 2262           | 189            | 120            | 9809           |                                                         |                                                                              |
| VANADIUM           | 0.01           | 0.01           | 0.03           | 0.16           | 0.01           | 0.05           |                                                         |                                                                              |
| ZINC               | 0.40           | 0.79           | 334            | 1.59           | 6.87           | 1427           |                                                         |                                                                              |
| PHOSPHORUS         | <0.13          | <0.13          | 1.87           | 0.49           | 0.48           | 8.31           |                                                         |                                                                              |
| STRONTIUM          | 0.33           | 0.36           | 0.92           | 2.69           | 0.16           | 0.95           |                                                         |                                                                              |







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SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S7<br>LEACHATE | S8<br>LEACHATE | S9<br>LEACHATE | S10<br>LEACHATE | S11<br>LEACHATE | S12<br>LEACHATE | REGISTERABLE<br>SOLID WASTE<br><br>(IF GREATER<br>THAN) | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE<br><br>(IF GREATER<br>THAN) |
|--------------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|---------------------------------------------------------|------------------------------------------------------------------------------|
| IDENTIFICATION NO. | 1641-07        | 1641-08        | 1641-09        | 1641-10         | 1641-11         | 1641-12         |                                                         |                                                                              |
|                    | CONCENTRATION  |                |                |                 |                 |                 |                                                         |                                                                              |
|                    | mg/L           | mg/L           | mg/L           | mg/L            | mg/L            | mg/L            | mg/L                                                    | mg/L                                                                         |
| ALUMINUM           | 0.12           | 0.21           | 0.24           | 1.03            | 0.09            | 0.29            |                                                         |                                                                              |
| BORON              | 0.72           | 0.41           | 3.39           | 0.38            | 0.02            | 1.26            | 50.0                                                    | 500.0                                                                        |
| BARIUM             | 1.29           | 1.42           | 1.67           | 1.53            | 0.24            | 1.40            | 10.0                                                    | 100.0                                                                        |
| BERYLLIUM          | <0.005         | <0.005         | <0.005         | <0.005          | <0.005          | <0.005          |                                                         |                                                                              |
| CADMIUM            | 5.51           | 0.732          | 9.28           | 2.16            | 0.012           | 1.20            | 0.05                                                    | 0.5                                                                          |
| CALCIUM            | 200            | 1578           | 708            | 1187            | 185             | 1312            |                                                         |                                                                              |
| CHROMIUM           | <0.02          | <0.02          | <0.02          | <0.02           | <0.02           | <0.02           | 0.5                                                     | 5.0                                                                          |
| COBALT             | 0.04           | 0.05           | 0.08           | 0.04            | <0.03           | 0.10            |                                                         |                                                                              |
| COPPER             | 0.56           | 1.30           | 0.15           | 0.87            | 0.01            | 0.42            |                                                         |                                                                              |
| IRON               | 0.03           | <0.02          | <0.02          | <0.02           | <0.02           | <0.02           |                                                         |                                                                              |
| LEAD               | 39.5           | 4.37           | 18.8           | 57.9            | <0.10           | 3.50            | 0.5                                                     | 5.0                                                                          |
| MAGNESIUM          | 26.0           | 83.3           | 84.2           | 52.7            | 8.16            | 69.6            |                                                         |                                                                              |
| MANGANESE          | 6.58           | 6.10           | 23.5           | 9.67            | 2.28            | 9.66            |                                                         |                                                                              |
| NICKEL             | 0.21           | 0.57           | 0.27           | 0.88            | 0.06            | 0.52            |                                                         |                                                                              |
| SILVER             | 0.02           | 0.11           | 0.93           | 0.78            | 0.02            | 0.18            | 0.5                                                     | 5.0                                                                          |
| SODIUM             | 13268          | 678            | 10555          | 5162            | 23.1            | 6972            |                                                         |                                                                              |
| VANADIUM           | 0.02           | 0.22           | 0.36           | 0.25            | 0.03            | 0.27            |                                                         |                                                                              |
| ZINC               | 1794           | 94.9           | 1498           | 734             | 0.10            | 999             |                                                         |                                                                              |
| PHOSPHORUS         | 10.7           | 1.05           | 10.4           | 5.27            | <0.13           | 5.84            |                                                         |                                                                              |
| STRONTIUM          | 0.86           | 3.66           | 3.56           | 2.89            | 0.30            | 2.64            |                                                         |                                                                              |







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SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S14<br>LEACHATE | S15<br>LEACHATE | S17<br>LEACHATE | S19<br>LEACHATE | S21<br>LEACHATE | S22<br>LEACHATE | REGISTERABLE<br>SOLID WASTE<br>(IF GREATER<br>THAN) | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE<br>(IF GREATER<br>THAN) |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------------------|--------------------------------------------------------------------------|
| IDENTIFICATION NO. | 1641-14         | 1641-15         | 1641-16         | 1641-17         | 1641-18         | 1641-19         |                                                     |                                                                          |
|                    | CONCENTRATION   |                 |                 |                 |                 |                 |                                                     |                                                                          |
|                    | mg/L            | mg/L            | mg/L            | mg/L            | mg/L            | mg/L            | mg/L                                                | mg/L                                                                     |
| ALUMINUM           | 0.06            | 0.11            | 0.11            | 0.32            | 0.13            | 0.95            |                                                     |                                                                          |
| BORON              | <0.01           | 0.05            | 2.77            | 4.83            | 1.01            | 0.55            | 50.0                                                | 500.0                                                                    |
| BARIUM             | 0.19            | 0.13            | 4.68            | 1.21            | 3.65            | 1.44            | 10.0                                                | 100.0                                                                    |
| BERYLLIUM          | <0.005          | <0.005          | <0.005          | <0.005          | <0.005          | <0.005          |                                                     |                                                                          |
| CADMIUM            | <0.012          | 0.022           | 21.5            | 7.21            | 6.90            | 1.10            | 0.05                                                | 0.5                                                                      |
| CALCIUM            | 7.98            | 332             | 424             | 570             | 266             | 530             |                                                     |                                                                          |
| CHROMIUM           | <0.02           | <0.02           | <0.02           | <0.02           | <0.02           | <0.02           | 0.5                                                 | 5.0                                                                      |
| COBALT             | <0.03           | 0.04            | 0.18            | 0.13            | 0.10            | 0.05            |                                                     |                                                                          |
| COPPER             | 0.01            | 0.04            | 0.16            | 0.28            | 0.36            | 0.76            |                                                     |                                                                          |
| IRON               | 0.03            | 0.14            | <0.02           | <0.02           | <0.02           | <0.02           |                                                     |                                                                          |
| LEAD               | <0.10           | <0.10           | 36.0            | 6.07            | 8.66            | 19.0            | 0.5                                                 | 5.0                                                                      |
| MAGNESIUM          | 2.53            | 2.21            | 123             | 84.8            | 75.6            | 38.9            |                                                     |                                                                          |
| MANGANESE          | 1.01            | 12.6            | 16.4            | 12.8            | 15.3            | 5.27            |                                                     |                                                                          |
| NICKEL             | 0.02            | 0.18            | 0.80            | 0.89            | 0.35            | 0.20            |                                                     |                                                                          |
| SILVER             | <0.01           | 0.02            | 0.16            | 0.20            | 0.40            | 0.25            | 0.5                                                 | 5.0                                                                      |
| SODIUM             | 38.2            | 46.2            | 13358           | 14116           | 19136           | 3641            |                                                     |                                                                          |
| VANADIUM           | 0.01            | 0.04            | 0.32            | 0.33            | 0.72            | 0.48            |                                                     |                                                                          |
| ZINC               | 5.10            | 0.12            | 1809            | 1934            | 2565            | 494             |                                                     |                                                                          |
| PHOSPHORUS         | <0.13           | <0.13           | 11.4            | 12.3            | 10.5            | 5.68            |                                                     |                                                                          |
| STRONTIUM          | 0.07            | 0.11            | 1.61            | 2.44            | 3.19            | 2.38            |                                                     |                                                                          |







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SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S23<br>LEACHATE | S24<br>LEACHATE | S25<br>LEACHATE | S26<br>LEACHATE | S28<br>LEACHATE | S29<br>LEACHATE | REGISTERABLE<br>SOLID WASTE<br>(IF GREATER<br>THAN) | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE<br>(IF GREATER<br>THAN) |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------------------|--------------------------------------------------------------------------|
| IDENTIFICATION NO. | 1641-20         | 1641-21         | 1641-22         | 1641-23         | 1641-24         | 1641-25         |                                                     |                                                                          |
|                    | CONCENTRATION   |                 |                 |                 |                 |                 |                                                     |                                                                          |
|                    | mg/L            | mg/L            | mg/L            | mg/L            | mg/L            | mg/L            | mg/L                                                | mg/L                                                                     |
| ALUMINUM           | 0.26            | 0.33            | 5.91            | 0.97            | 0.40            | 3.57            |                                                     |                                                                          |
| BORON              | 0.09            | 0.31            | 0.88            | 0.68            | 0.55            | 5.57            | 50.0                                                | 500.0                                                                    |
| BARIUM             | 0.52            | 1.47            | 1.09            | 1.69            | 3.92            | 1.39            | 10.0                                                | 100.0                                                                    |
| BERYLLIUM          | <0.005          | <0.005          | <0.005          | <0.005          | <0.005          | <0.005          |                                                     |                                                                          |
| CADMIUM            | 0.041           | 0.112           | 2.03            | 1.77            | 6.92            | 8.25            | 0.05                                                | 0.5                                                                      |
| CALCIUM            | 879             | 328             | 1148            | 697             | 334             | 715             |                                                     |                                                                          |
| CHROMIUM           | <0.02           | <0.02           | <0.02           | <0.02           | <0.02           | 0.83            | 0.5                                                 | 5.0                                                                      |
| COBALT             | 0.02            | 0.04            | 0.04            | 0.02            | 0.11            | 0.63            |                                                     |                                                                          |
| COPPER             | 0.08            | 7.31            | 1.38            | 4.57            | 1.14            | 0.59            |                                                     |                                                                          |
| IRON               | 0.08            | <0.02           | <0.02           | <0.02           | <0.02           | 0.90            |                                                     |                                                                          |
| LEAD               | 0.58            | 7.78            | 81.6            | 38.3            | 7.52            | 4.66            | 0.5                                                 | 5.0                                                                      |
| MAGNESIUM          | 34.2            | 82.7            | 60.7            | 39.3            | 54.6            | 102             |                                                     |                                                                          |
| MANGANESE          | 6.27            | 2.62            | 10.3            | 4.38            | 9.31            | 14.1            |                                                     |                                                                          |
| NICKEL             | 0.12            | 0.76            | 0.66            | 0.56            | 2.49            | 0.39            |                                                     |                                                                          |
| SILVER             | 0.10            | 0.09            | 0.30            | 0.24            | 0.75            | 0.36            | 0.5                                                 | 5.0                                                                      |
| SODIUM             | 180             | 465             | 3662            | 1280            | 18248           | 6712            |                                                     |                                                                          |
| Vanadium           | 0.17            | 0.15            | 0.45            | 0.32            | 0.90            | 0.40            |                                                     |                                                                          |
| ZINC               | 13.6            | 60.4            | 511             | 172             | 2483            | 1981            |                                                     |                                                                          |
| PHOSPHORUS         | <0.13           | 1.48            | 7.03            | 3.10            | 20.9            | 11.0            |                                                     |                                                                          |
| STRONTIUM          | 1.65            | 0.86            | 4.02            | 2.04            | 3.59            | 3.72            |                                                     |                                                                          |



| IDENTIFICATION NO. |  |  |  | DATE       |  |  |  | TIME  |  |  |  |
|--------------------|--|--|--|------------|--|--|--|-------|--|--|--|
| 1886-1             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-2             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-3             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-4             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-5             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-6             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-7             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-8             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-9             |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-10            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-11            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-12            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-13            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-14            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-15            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-16            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-17            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-18            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-19            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-20            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-21            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-22            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-23            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-24            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-25            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-26            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-27            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-28            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-29            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-30            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-31            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-32            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-33            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-34            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-35            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-36            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-37            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-38            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-39            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-40            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-41            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-42            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-43            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-44            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-45            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-46            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-47            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-48            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-49            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-50            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-51            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-52            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-53            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-54            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-55            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-56            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-57            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-58            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-59            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-60            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-61            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-62            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-63            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-64            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-65            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-66            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-67            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-68            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-69            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-70            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-71            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-72            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-73            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-74            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-75            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-76            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-77            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-78            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-79            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-80            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-81            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-82            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-83            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-84            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-85            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-86            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-87            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-88            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-89            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-90            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-91            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-92            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-93            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-94            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-95            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-96            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-97            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-98            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-99            |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |
| 1886-100           |  |  |  | 1964-08-08 |  |  |  | 10:00 |  |  |  |



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SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S30<br>LEACHATE | S31<br>LEACHATE | S32<br>LEACHATE | S34<br>LEACHATE | S35<br>LEACHATE | S36<br>LEACHATE | REGISTERABLE<br>SOLID WASTE | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------|--------------------------------------------------|
| IDENTIFICATION NO. | 1696-07         | 1696-08         | 1696-09         | 1696-10         | 1696-11         | 1696-12         | (IF GREATER<br>THAN)        | (IF GREATER<br>THAN)                             |
|                    | CONCENTRATION   |                 |                 |                 |                 |                 |                             |                                                  |
|                    | mg/L            | mg/L            | mg/L            | mg/L            | mg/L            | mg/L            | mg/L                        | mg/L                                             |
| ALUMINUM           | 0.39            | 0.15            | 0.67            | 25.8            | 0.40            | 0.11            |                             |                                                  |
| BORON              | 1.66            | 2.89            | 4.20            | 0.63            | 0.10            | 0.06            | 50.0                        | 500.0                                            |
| BARIUM             | 1.09            | 2.53            | 0.50            | 2.90            | 1.76            | 0.58            | 10.0                        | 100.0                                            |
| BERYLLIUM          | <0.005          | <0.005          | <0.005          | <0.005          | <0.005          | <0.005          |                             |                                                  |
| CADMIUM            | 0.874           | 16.3            | 14.1            | 0.064           | 0.012           | 0.014           | 0.05                        | 0.5                                              |
| CALCIUM            | 245             | 467             | 1188            | 295             | 2238            | 733             |                             |                                                  |
| CHROMIUM           | <0.02           | <0.02           | <0.02           | <0.02           | <0.02           | <0.02           | 0.5                         | 5.0                                              |
| COBALT             | 0.04            | 0.15            | 0.11            | 0.04            | 0.04            | <0.03           |                             |                                                  |
| COPPER             | 2.76            | 0.60            | 1.18            | 25.2            | 0.16            | 0.05            |                             |                                                  |
| IRON               | 0.14            | <0.02           | 0.08            | 1.28            | 0.10            | <0.02           |                             |                                                  |
| LEAD               | 13.7            | 6.65            | 7.46            | 14.1            | 0.29            | 0.32            | 0.5                         | 5.0                                              |
| MAGNESIUM          | 78.0            | 246             | 192             | 59.1            | 34.5            | 77.1            |                             |                                                  |
| MANGANESE          | 2.65            | 20.7            | 31.7            | 3.14            | 8.41            | 3.68            |                             |                                                  |
| NICKEL             | 1.40            | 0.56            | 0.64            | 1.41            | 0.16            | 0.11            |                             |                                                  |
| SILVER             | 0.05            | 0.13            | 0.08            | 0.02            | 0.13            | 0.04            | 0.5                         | 5.0                                              |
| SODIUM             | 2914            | 14085           | 10042           | 1982            | 62.9            | 16.0            |                             |                                                  |
| VANADIUM           | 0.05            | 0.10            | 0.12            | 0.03            | 0.16            | 0.08            |                             |                                                  |
| ZINC               | 365             | 1780            | 1349            | 247             | 1.16            | 0.60            |                             |                                                  |
| PHOSPHORUS         | 1.77            | 7.25            | 5.00            | 3.09            | <0.13           | <0.13           |                             |                                                  |
| STRONTIUM          | 0.40            | 0.82            | 1.04            | 0.85            | 3.65            | 1.23            |                             |                                                  |



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SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S37<br>LEACHATE | S39<br>LEACHATE | S40<br>LEACHATE | S41<br>LEACHATE | REGISTERABLE<br>SOLID WASTE<br><br>(IF GREATER<br>THAN) | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE<br>(IF GREATER<br>THAN) |
|--------------------|-----------------|-----------------|-----------------|-----------------|---------------------------------------------------------|--------------------------------------------------------------------------|
| IDENTIFICATION NO. | 1710-01         | 1710-02         | 1710-03         | 1710-04         |                                                         |                                                                          |
|                    | CONCENTRATION   |                 |                 |                 |                                                         |                                                                          |
|                    | mg/L            | mg/L            | mg/L            | mg/L            | mg/L                                                    | mg/L                                                                     |
| ALUMINUM           | 0.78            | 0.58            | 0.42            | 1.20            |                                                         |                                                                          |
| BORON              | 1.54            | 0.42            | 1.04            | 0.49            | 50.0                                                    | 500.0                                                                    |
| BARIUM             | 1.25            | 1.83            | 3.04            | 1.34            | 10.0                                                    | 100.0                                                                    |
| BERYLLIUM          | <0.005          | <0.005          | <0.005          | <0.005          |                                                         |                                                                          |
| CADMIUM            | 3.743           | 5.536           | 14.4            | 0.758           | 0.05                                                    | 0.5                                                                      |
| CALCIUM            | 961             | 416             | 471             | 634             |                                                         |                                                                          |
| CHROMIUM           | <0.02           | <0.02           | <0.02           | <0.02           | 0.5                                                     | 5.0                                                                      |
| COBALT             | 0.21            | 0.23            | 0.15            | 0.13            |                                                         |                                                                          |
| COPPER             | 0.76            | 0.82            | 0.48            | 0.66            |                                                         |                                                                          |
| IRON               | <0.02           | 0.08            | <0.02           | <0.02           |                                                         |                                                                          |
| LEAD               | 6.71            | 2.86            | 26.4            | 31.5            | 0.5                                                     | 5.0                                                                      |
| MAGNESIUM          | 277             | 94.4            | 38.4            | 36.1            |                                                         |                                                                          |
| MANGANESE          | 16.6            | 8.56            | 7.87            | 7.44            |                                                         |                                                                          |
| NICKEL             | 0.36            | 0.32            | 0.14            | 0.24            |                                                         |                                                                          |
| SILVER             | 0.09            | 0.05            | 0.06            | 0.05            | 0.5                                                     | 5.0                                                                      |
| SODIUM             | 6799            | 12442           | 14085           | 4332            |                                                         |                                                                          |
| VANADIUM           | 0.11            | 0.05            | 0.03            | 0.07            |                                                         |                                                                          |
| ZINC               | 1129            | 2107            | 2271            | 724             |                                                         |                                                                          |
| PHOSPHORUS         | 5.89            | 8.81            | 9.40            | 3.17            |                                                         |                                                                          |
| STRONTIUM          | 3.57            | 3.33            | 2.09            | 2.70            |                                                         |                                                                          |



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SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S42<br>LEACHATE | S43<br>LEACHATE | S44<br>LEACHATE | S45<br>LEACHATE | REGISTERABLE<br>SOLID WASTE | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------------------|--------------------------------------------------|
| IDENTIFICATION NO. | 1710-05         | 1710-06         | 1710-07         | 1710-08         | (IF GREATER<br>THAN)        | (IF GREATER<br>THAN)                             |
|                    | CONCENTRATION   |                 |                 |                 |                             |                                                  |
|                    | mg/L            | mg/L            | mg/L            | mg/L            | mg/L                        | mg/L                                             |
| ALUMINUM           | 0.45            | 0.65            | 0.56            | 0.51            |                             |                                                  |
| BORON              | 0.21            | 0.05            | 0.04            | 0.02            | 50.0                        | 500.0                                            |
| BARIUM             | 5.50            | 1.44            | 0.43            | 0.33            | 10.0                        | 100.0                                            |
| BERYLLIUM          | <0.005          | <0.005          | <0.005          | <0.005          |                             |                                                  |
| CADMIUM            | 11.2            | 0.012           | <0.012          | <0.012          | 0.05                        | 0.5                                              |
| CALCIUM            | 512             | 1531            | 253             | 71.8            |                             |                                                  |
| CHROMIUM           | <0.02           | <0.02           | <0.02           | <0.02           | 0.5                         | 5.0                                              |
| COBALT             | 0.07            | 0.06            | 0.11            | <0.03           |                             |                                                  |
| COPPER             | 0.10            | 0.07            | 0.05            | 0.04            |                             |                                                  |
| IRON               | <0.02           | <0.02           | 0.11            | 0.02            |                             |                                                  |
| LEAD               | 39.3            | <0.10           | <0.10           | <0.10           | 0.5                         | 5.0                                              |
| MAGNESIUM          | 80.0            | 32.1            | 29.5            | 12.8            |                             |                                                  |
| MANGANESE          | 23.0            | 7.54            | 1.40            | 0.65            |                             |                                                  |
| NICKEL             | 0.16            | 0.05            | 0.30            | <0.02           |                             |                                                  |
| SILVER             | 0.07            | 0.09            | 0.04            | 0.03            | 0.5                         | 5.0                                              |
| SODIUM             | 9637            | 214             | 201             | 201             |                             |                                                  |
| VANADIUM           | 0.05            | 0.12            | 0.04            | 0.02            |                             |                                                  |
| ZINC               | 1565            | 0.25            | 1.69            | 2.10            |                             |                                                  |
| PHOSPHORUS         | 7.56            | <0.13           | <0.13           | <0.13           |                             |                                                  |
| STRONTIUM          | 2.28            | 2.61            | 1.53            | 0.30            |                             |                                                  |



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SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S46<br>LEACHATE | S47<br>LEACHATE | S48<br>LEACHATE | S49<br>LEACHATE | REGISTERABLE<br>SOLID WASTE<br>(IF GREATER<br>THAN) | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE<br>(IF GREATER<br>THAN) |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------------------|--------------------------------------------------------------------------|
| IDENTIFICATION NO. | 1727-01         | 1727-02         | 1727-03         | 1727-04         |                                                     |                                                                          |
|                    | CONCENTRATION   |                 |                 |                 |                                                     |                                                                          |
|                    | mg/L            | mg/L            | mg/L            | mg/L            | mg/L                                                | mg/L                                                                     |
| ALUMINUM           | 0.11            | 0.45            | 0.32            | <0.05           |                                                     |                                                                          |
| BORON              | 1.61            | 0.09            | 0.09            | 0.26            | 50.0                                                | 500.0                                                                    |
| BARIUM             | 4.84            | 0.31            | 0.83            | 2.10            | 10.0                                                | 100.0                                                                    |
| BERYLLIUM          | <0.005          | <0.005          | <0.005          | <0.005          |                                                     |                                                                          |
| CADMIUM            | 13.5            | <0.012          | <0.012          | 5.93            | 0.05                                                | 0.5                                                                      |
| CALCIUM            | 393             | 64.7            | 1630            | 499             |                                                     |                                                                          |
| CHROMIUM           | <0.02           | <0.02           | <0.02           | <0.02           | 0.5                                                 | 5.0                                                                      |
| COBALT             | 0.16            | <0.03           | 0.06            | 0.13            |                                                     |                                                                          |
| COPPER             | 0.19            | 0.02            | 0.08            | 0.70            |                                                     |                                                                          |
| IRON               | <0.02           | <0.02           | 0.76            | <0.02           |                                                     |                                                                          |
| LEAD               | 16.9            | 1.31            | 0.30            | 3.08            | 0.5                                                 | 5.0                                                                      |
| MAGNESIUM          | 146             | 11.6            | 33.8            | 54.4            |                                                     |                                                                          |
| MANGANESE          | 12.9            | 1.20            | 16.9            | 6.35            |                                                     |                                                                          |
| NICKEL             | 0.10            | <0.02           | <0.02           | 0.09            |                                                     |                                                                          |
| SILVER             | 0.09            | 0.05            | 0.15            | 0.12            | 0.5                                                 | 5.0                                                                      |
| SODIUM             | 12480           | 234             | 219             | 13700           |                                                     |                                                                          |
| VANADIUM           | 0.10            | 0.07            | 0.20            | 0.12            |                                                     |                                                                          |
| ZINC               | 1900            | 1.15            | 1.64            | 2260            |                                                     |                                                                          |
| PHOSPHORUS         | 770             | <0.13           | <0.13           | 7.73            |                                                     |                                                                          |
| STRONTIUM          | 1.82            | 0.21            | 4.30            | 1.27            |                                                     |                                                                          |



| IDENTIFICATION NO. | TEST NO. | TEST NO. | TEST NO. | TEST NO. | TEST NO. | TEST NO. | TEST NO. |
|--------------------|----------|----------|----------|----------|----------|----------|----------|
| 1                  | 1        | 1        | 1        | 1        | 1        | 1        | 1        |
| 2                  | 2        | 2        | 2        | 2        | 2        | 2        | 2        |
| 3                  | 3        | 3        | 3        | 3        | 3        | 3        | 3        |
| 4                  | 4        | 4        | 4        | 4        | 4        | 4        | 4        |
| 5                  | 5        | 5        | 5        | 5        | 5        | 5        | 5        |
| 6                  | 6        | 6        | 6        | 6        | 6        | 6        | 6        |
| 7                  | 7        | 7        | 7        | 7        | 7        | 7        | 7        |
| 8                  | 8        | 8        | 8        | 8        | 8        | 8        | 8        |
| 9                  | 9        | 9        | 9        | 9        | 9        | 9        | 9        |
| 10                 | 10       | 10       | 10       | 10       | 10       | 10       | 10       |
| 11                 | 11       | 11       | 11       | 11       | 11       | 11       | 11       |
| 12                 | 12       | 12       | 12       | 12       | 12       | 12       | 12       |
| 13                 | 13       | 13       | 13       | 13       | 13       | 13       | 13       |
| 14                 | 14       | 14       | 14       | 14       | 14       | 14       | 14       |
| 15                 | 15       | 15       | 15       | 15       | 15       | 15       | 15       |
| 16                 | 16       | 16       | 16       | 16       | 16       | 16       | 16       |
| 17                 | 17       | 17       | 17       | 17       | 17       | 17       | 17       |
| 18                 | 18       | 18       | 18       | 18       | 18       | 18       | 18       |
| 19                 | 19       | 19       | 19       | 19       | 19       | 19       | 19       |
| 20                 | 20       | 20       | 20       | 20       | 20       | 20       | 20       |
| 21                 | 21       | 21       | 21       | 21       | 21       | 21       | 21       |
| 22                 | 22       | 22       | 22       | 22       | 22       | 22       | 22       |
| 23                 | 23       | 23       | 23       | 23       | 23       | 23       | 23       |
| 24                 | 24       | 24       | 24       | 24       | 24       | 24       | 24       |
| 25                 | 25       | 25       | 25       | 25       | 25       | 25       | 25       |
| 26                 | 26       | 26       | 26       | 26       | 26       | 26       | 26       |
| 27                 | 27       | 27       | 27       | 27       | 27       | 27       | 27       |
| 28                 | 28       | 28       | 28       | 28       | 28       | 28       | 28       |
| 29                 | 29       | 29       | 29       | 29       | 29       | 29       | 29       |
| 30                 | 30       | 30       | 30       | 30       | 30       | 30       | 30       |
| 31                 | 31       | 31       | 31       | 31       | 31       | 31       | 31       |
| 32                 | 32       | 32       | 32       | 32       | 32       | 32       | 32       |
| 33                 | 33       | 33       | 33       | 33       | 33       | 33       | 33       |
| 34                 | 34       | 34       | 34       | 34       | 34       | 34       | 34       |
| 35                 | 35       | 35       | 35       | 35       | 35       | 35       | 35       |
| 36                 | 36       | 36       | 36       | 36       | 36       | 36       | 36       |
| 37                 | 37       | 37       | 37       | 37       | 37       | 37       | 37       |
| 38                 | 38       | 38       | 38       | 38       | 38       | 38       | 38       |
| 39                 | 39       | 39       | 39       | 39       | 39       | 39       | 39       |
| 40                 | 40       | 40       | 40       | 40       | 40       | 40       | 40       |
| 41                 | 41       | 41       | 41       | 41       | 41       | 41       | 41       |
| 42                 | 42       | 42       | 42       | 42       | 42       | 42       | 42       |
| 43                 | 43       | 43       | 43       | 43       | 43       | 43       | 43       |
| 44                 | 44       | 44       | 44       | 44       | 44       | 44       | 44       |
| 45                 | 45       | 45       | 45       | 45       | 45       | 45       | 45       |
| 46                 | 46       | 46       | 46       | 46       | 46       | 46       | 46       |
| 47                 | 47       | 47       | 47       | 47       | 47       | 47       | 47       |
| 48                 | 48       | 48       | 48       | 48       | 48       | 48       | 48       |
| 49                 | 49       | 49       | 49       | 49       | 49       | 49       | 49       |
| 50                 | 50       | 50       | 50       | 50       | 50       | 50       | 50       |
| 51                 | 51       | 51       | 51       | 51       | 51       | 51       | 51       |
| 52                 | 52       | 52       | 52       | 52       | 52       | 52       | 52       |
| 53                 | 53       | 53       | 53       | 53       | 53       | 53       | 53       |
| 54                 | 54       | 54       | 54       | 54       | 54       | 54       | 54       |
| 55                 | 55       | 55       | 55       | 55       | 55       | 55       | 55       |
| 56                 | 56       | 56       | 56       | 56       | 56       | 56       | 56       |
| 57                 | 57       | 57       | 57       | 57       | 57       | 57       | 57       |
| 58                 | 58       | 58       | 58       | 58       | 58       | 58       | 58       |



**CANVIRO**  
Analytical Laboratories Ltd.

SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | S50<br>LEACHATE | S51<br>LEACHATE | S52<br>LEACHATE | REGISTERABLE<br>SOLID WASTE | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE |
|--------------------|-----------------|-----------------|-----------------|-----------------------------|--------------------------------------------------|
| IDENTIFICATION NO. | 1727-05         | 1727-06         | 1727-07         | (IF GREATER<br>THAN)        | (IF GREATER<br>THAN)                             |
|                    | CONCENTRATION   |                 |                 |                             |                                                  |
|                    | mg/L            | mg/L            | mg/L            | mg/L                        | mg/L                                             |
| ALUMINUM           | <0.05           | 0.20            | 0.10            |                             |                                                  |
| BORON              | 0.62            | 0.08            | 2.26            | 50.0                        | 500.0                                            |
| BARIUM             | 0.66            | 1.10            | 2.62            | 10.0                        | 100.0                                            |
| BERYLLIUM          | <0.005          | <0.005          | <0.005          |                             |                                                  |
| CADMIUM            | 3.36            | <0.012          | 6.16            | 0.05                        | 0.5                                              |
| CALCIUM            | 457             | 415             | 283             |                             |                                                  |
| CHROMIUM           | <0.02           | <0.02           | <0.02           | 0.5                         | 5.0                                              |
| COBALT             | 0.13            | <0.03           | 0.19            |                             |                                                  |
| COPPER             | 0.54            | 0.12            | 0.24            |                             |                                                  |
| IRON               | <0.02           | <0.02           | <0.02           |                             |                                                  |
| LEAD               | 3.60            | 0.14            | 12.0            | 0.5                         | 5.0                                              |
| MAGNESIUM          | 124             | 37.9            | 181             |                             |                                                  |
| MANGANESE          | 14.7            | 2.63            | 16.3            |                             |                                                  |
| NICKEL             | 0.09            | <0.02           | 0.09            |                             |                                                  |
| SILVER             | 0.14            | 0.11            | 0.14            | 0.5                         | 5.0                                              |
| SODIUM             | 13030           | 218             | 13930           |                             |                                                  |
| VANADIUM           | 0.15            | 0.13            | 0.11            |                             |                                                  |
| ZINC               | 2100            | 3.34            | 1930            |                             |                                                  |
| PHOSPHORUS         | 6.84            | <0.13           | 7.34            |                             |                                                  |
| STRONTIUM          | 3.78            | 1.17            | 0.79            |                             |                                                  |



[illegible]





**CANVIRO**  
Analytical Laboratories Ltd.

SUMMARY OF LEACHATE CHARACTERISTICS OF SAMPLES SUBMITTED FROM LAX PROJECT

| IDENTIFICATION     | HA5<br>LEACHATE | NP1<br>LEACHATE | NP2<br>LEACHATE | NP3<br>LEACHATE | SP1<br>LEACHATE | SP3<br>LEACHATE | REGISTERABLE<br>SOLID WASTE<br>(IF GREATER<br>THAN) | LEACHATE<br>TOXIC WASTE<br>OR HAZARDOUS<br>WASTE<br>(IF GREATER<br>THAN) |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------------------|--------------------------------------------------------------------------|
| IDENTIFICATION NO. | 1696-01         | 1696-02         | 1696-03         | 1696-04         | 1696-05         | 1696-06         |                                                     |                                                                          |
|                    | CONCENTRATION   |                 |                 |                 |                 |                 |                                                     |                                                                          |
|                    | mg/L            | mg/L            | mg/L            | mg/L            | mg/L            | mg/L            | mg/L                                                | mg/L                                                                     |
| ALUMINUM           | 0.89            | 0.55            | 0.30            | 0.76            | 0.22            | 0.37            |                                                     |                                                                          |
| BORON              | 0.05            | 0.02            | 0.24            | 0.04            | 0.04            | 0.06            | 50.0                                                | 500.0                                                                    |
| BARIUM             | 0.57            | 0.17            | 0.67            | 0.58            | 0.36            | 1.12            | 10.0                                                | 100.0                                                                    |
| BERYLLIUM          | <0.005          | <0.005          | <0.005          | <0.005          | <0.005          | <0.005          |                                                     |                                                                          |
| CADMIUM            | 0.025           | <0.012          | <0.012          | 0.034           | <0.012          | 0.016           | 0.05                                                | 0.5                                                                      |
| CALCIUM            | 166             | 40.8            | 346             | 176             | 131             | 1596            |                                                     |                                                                          |
| CHROMIUM           | <0.02           | <0.02           | <0.02           | <0.02           | <0.02           | <0.02           | 0.5                                                 | 5.0                                                                      |
| COBALT             | <0.03           | <0.03           | <0.03           | <0.03           | <0.03           | <0.03           |                                                     |                                                                          |
| COPPER             | 0.03            | 0.01            | 0.02            | 0.15            | 0.01            | 0.14            |                                                     |                                                                          |
| IRON               | 11.9            | 2.67            | 1.35            | <0.02           | <0.02           | 0.41            |                                                     |                                                                          |
| LEAD               | 0.96            | <0.10           | 0.28            | 0.30            | <0.10           | 0.34            | 0.5                                                 | 5.0                                                                      |
| MAGNESIUM          | 19.6            | 8.28            | 31.2            | 16.5            | 17.5            | 31.1            |                                                     |                                                                          |
| MANGANESE          | 8.72            | 1.34            | 5.96            | 2.18            | 0.67            | 8.54            |                                                     |                                                                          |
| NICKEL             | 0.21            | <0.02           | 0.10            | 1.35            | <0.02           | 0.18            |                                                     |                                                                          |
| SILVER             | 0.02            | <0.02           | 0.02            | <0.02           | <0.02           | 0.09            | 0.5                                                 | 5.0                                                                      |
| SODIUM             | 69.9            | 4.72            | 10.6            | 90.9            | 8.69            | 53.3            |                                                     |                                                                          |
| VANADIUM           | 0.02            | <0.01           | 0.03            | 0.02            | 0.01            | 0.12            |                                                     |                                                                          |
| ZINC               | 9.72            | 0.32            | 0.33            | 12.6            | 0.79            | 1.23            |                                                     |                                                                          |
| PHOSPHORUS         | <0.13           | <0.13           | <0.13           | <0.13           | <0.13           | <0.13           |                                                     |                                                                          |
| STRONTIUM          | 0.22            | <0.04           | 1.04            | 1.12            | 0.56            | 2.10            |                                                     |                                                                          |

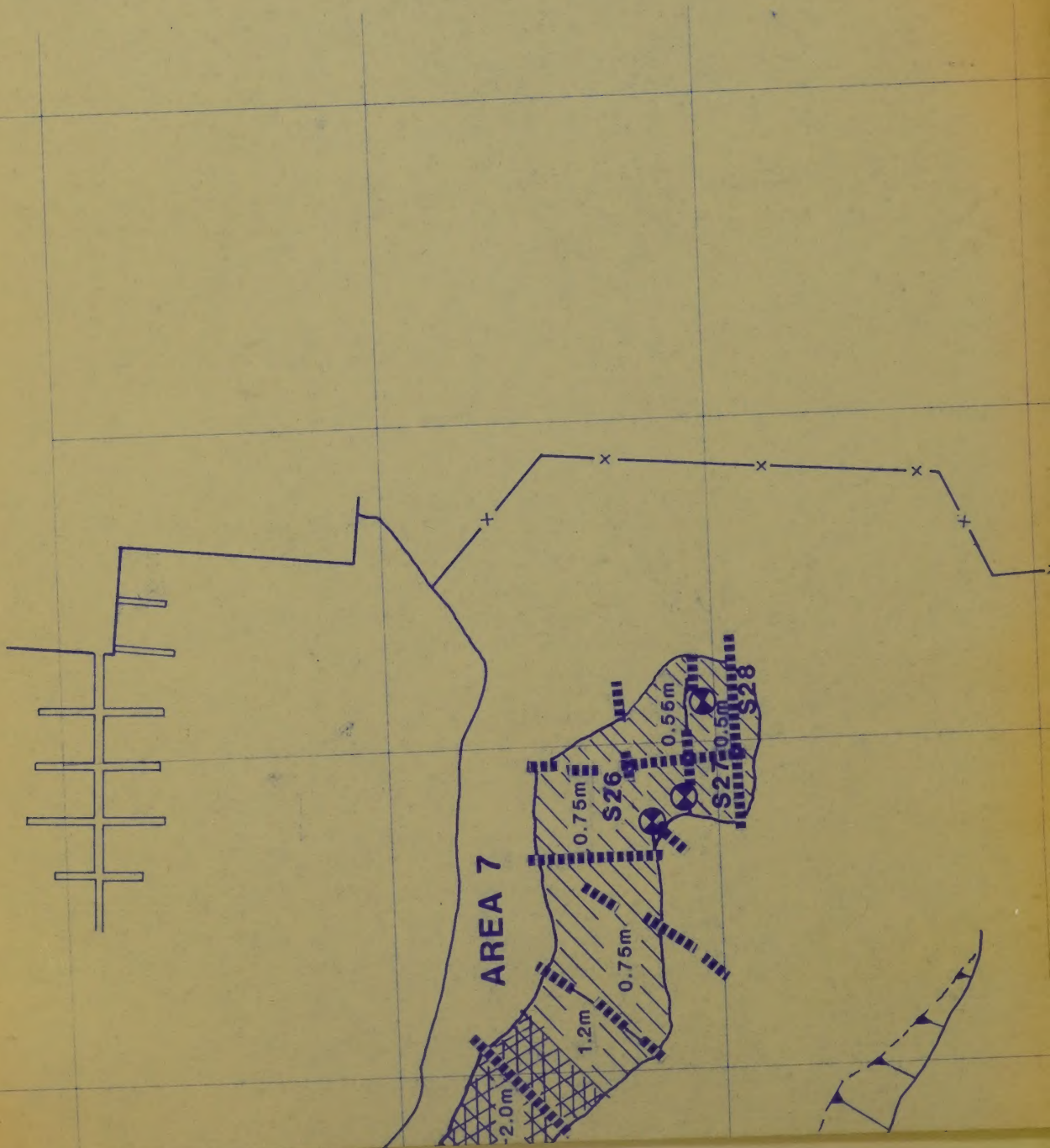












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